

# Personal Systems

IBM'S MAGAZINE FOR PC PROFESSIONALS

JANUARY/FEBRUARY 1996



Lotus Notes:  
Linking the World

Getting Connected  
with cc:Mail

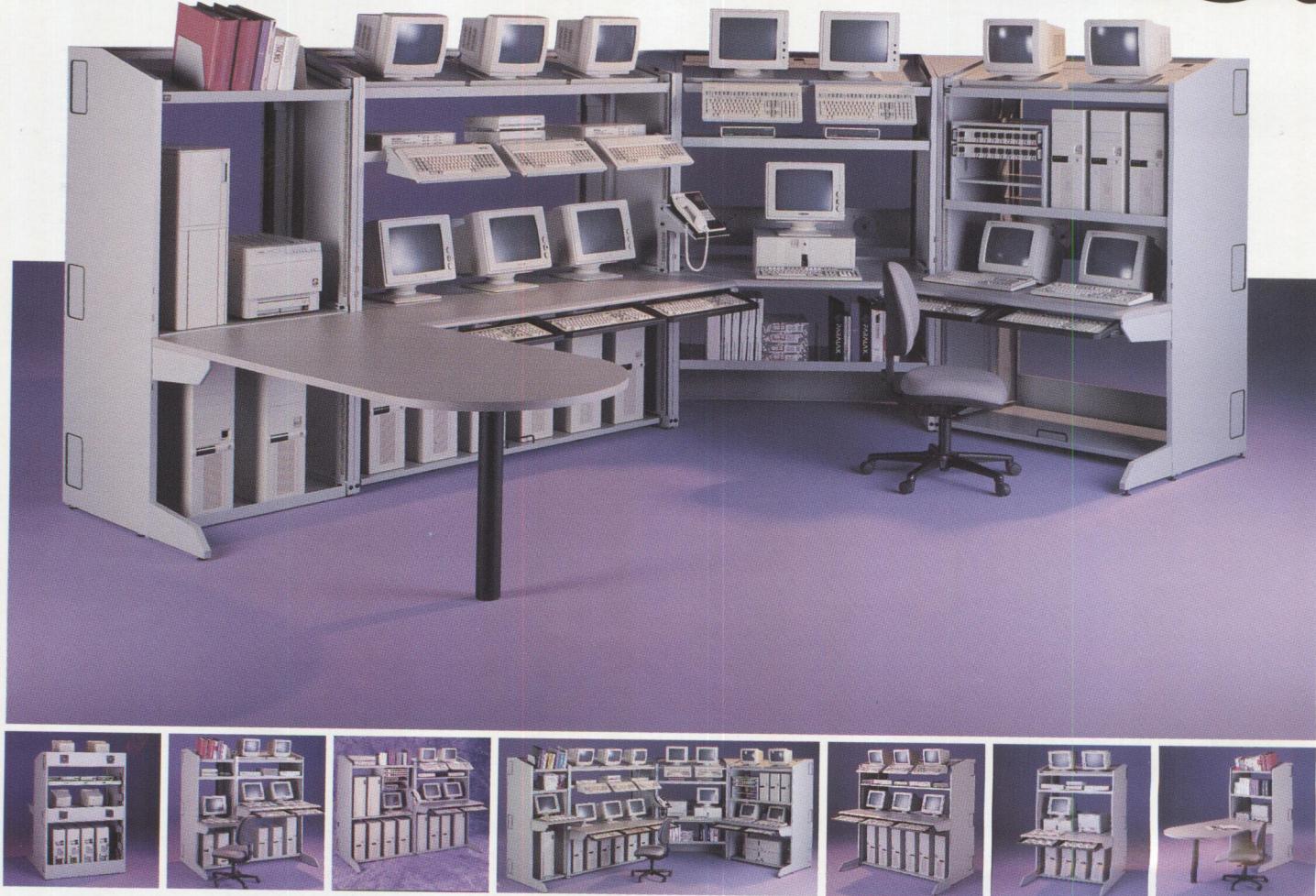
Lotus Notes for AIX

OS/2 Warp Connect

BULK RATE  
U.S. POSTAGE  
PAID  
PERMIT 1016  
FORT WORTH, TEXAS

IBM

# NO-ONE ELSE OFFERS LAN FLEXIBILITY LIKE NETCOM3.



Your LAN environment is not like any other. That's why NetCom3 can be configured in literally thousands of ways. This modular, ergonomic, attractive LAN furniture makes every inch count. Every time you reconfigure.



Call about our 48-Hour Quick Ship Program! 1.800.432.1337

Call now for a  
FREE demo disk

and brochure on the award-winning  
line of NetCom furniture from EDP.



**NetCom<sup>TM</sup>3**

EDP  
engineered  
data products  
INCORPORATED

A product of Engineered Data Products, Inc.  
2550 West Midway Blvd.  
Broomfield, CO 80020 (303) 465.2800

Circle #20 on reader service card.

Do you cringe everytime you see those strange error messages on your desktop? Wouldn't it be great to boot OS/2 much faster? Or how about cleaning up precious hard disk space by totally uninstalling OS/2 programs you never use?

Special Introductory Price!!  
**\$79.95!!**

TM

# UNIMAIN<sup>TM</sup>

System Maintenance and Uninstaller for OS/2

## UNINSTALLER

You have this program, you might have booted it up once. It's taking up disk space and cluttering up your desktop! You could delete the program from your disk drive but various system entries and associated files from the program are scattered EVERYWHERE! You sit back and breath easier now. You know you have UniMaint<sup>TM</sup>. UniMaint will completely remove that program and ALL of it's associated files including system entries! All you have to do is simply drag the program icon to the UniMaint Uninstall icon and -- it is history.

## SYSTEM PERFORMANCE

UniMaint improves system performance and desktop reliability by helping you maintain key system files. You now can easily maintain all those pesky INI files, including the OS2.INI and OS2SYS.INI files. You can also purge obsolete Workplace Shell entries and fully edit all INI files! What this means to you is FASTER AND MORE RELIABLE OS/2 PERFORMANCE!

## DESKTOP BACKUP AND PORTABILITY

Your pride and joy. The ultimate desktop layout. What a devastating blow it would be if you lost it! You can sleep easier now because UniMaint will backup and restore your desktop, and it's FULLY customizable! Your desktop at home is the desktop of all desktops but that one at work really isn't up to par. You don't have the time to set down at the office and arrange that desktop to meet your standards. With UniMaint all you have to do is put your home desktop on a disk and take it to the office and WOW!! The ultimate desktop layout is now in the office. You have total desktop portability that is flexible and easy to use.

[800] 944-3028

[405] 947-8085



fax [405] 632-6537

Outside U.S. & Canada

**SoftTouch Systems, Inc.  
Workstation Division**

**1300 South Meridian, Suite 600, Oklahoma City, OK 73108-1751**

# The Information Age— A Time for Responsibility



A recent *Fortune* article examined how the Internet's growth—perhaps the biggest event since the creation of the personal computer—is still a work-in-progress that will likely evolve in ways not anticipated by any company. "Indeed, the Internet is already so big that it is almost a force of nature."

There's so much information available now that we're beginning to figure out ways to stop the flow, or at least monitor and control how people are using these vast information channels. We're approaching a fine line here—censorship is working its way into cyberspace.

Hasn't progress always come at a price? We can travel across the country in a matter of hours in cars and airplanes, but at the cost of air and noise pollution. We can illuminate, cool, and heat our homes and offices, but at the cost of natural fuel resources. We can eat cheese cake, heavy gravy, all those things the experts say are bad for us, but at the cost of . . . well, you get the picture.

But let's get back to the serious subject of censoring information. The debate is on: Should we regulate what information gets on the Internet? Do employers have the right to monitor their employees' activities on the Internet? This doesn't have to be an all or nothing situation. Parents have an obligation to determine, based on their own values, what they want their children exposed to. Yet, you and I have a constitutional right to decide for ourselves what we read and listen to. Companies have a right to expect their employees to devote the hours for which they are being paid to productive work—that is, they have the right to determine how employees use the Internet during working hours.

So, let's accept our responsibilities as parents, employees, and mature adults. The responsibility of the information provider, be it Internet, newspapers, television, or the movie industry, is just that—providing information. What we view, read, or listen to is ultimately our responsibility. And I believe the majority of us have enough common sense to accept that responsibility.

## Check It Out!

The good information on the Internet far outweighs the bad stuff that makes the news! Did you know Campbell Soup has a Web page? (It's at <http://www.campbellsoups.com>.) Now that the weather is colder, I'm thinking of checking it out for "Sunday afternoon, sitting by the fireplace, watching football" recipes!

And you should check out *Personal Systems*' Web pages at <http://pscc.dfw.ibm.com/psmag/> for current and previously published articles and links to our business partners and IBM's Home Page. We're a wealth of responsible information!

Don't forget you always have the opportunity to tell us how we're doing. Our Web pages provide numerous opportunities to contact us or authors directly via e-mail. Plus each *Personal Systems* issue contains our staff's Internet IDs and a pre-paid response card.

*Betty Hawkins*

Betty Hawkins, Editor

# New Multimedia Sound Card for Micro Channel

New Product

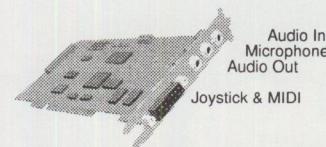
Innovative 'ChipChat Sound Card' provides state-of-the-art multimedia audio for Micro Channel computers. Supports DOS, Windows, OS/2, and AIX . . .

**I**NTRODUCING THE ChipChat® Sound Card, an exciting new product that provides state-of-the-art multimedia audio for Micro Channel computers.

Add this sound card to your PC and hear CD quality audio from your favorite multimedia programs.

The ChipChat Sound Card fits into a full or half sized slot on a Micro Channel® computer. It's hardware compatible with just about every DOS game and educational software out there, including those that require SoundBlaster® compatibility.

The ChipChat Sound Card comes with its own high performance software drivers with 16-bit audio for Windows® and for OS/2®. It also "works like a charm" with the 8-bit audio SoundBlaster drivers which are shipped as standard with OS/2.



ChipChat Sound Card for Micro Channel

## State of the Art Music Synthesis

The ChipChat Sound Card provides state-of-the-art music synthesis in two forms: FM and WaveTable.

FM uses mathematical formulas to emulate the sound of musical instruments. FM synthesis provides good quality sounds and is economical.

WaveTable synthesis stores 128 actual musical instrument samples on a tiny chip, so it makes music that sounds great - just like the actual instrument! WaveTable is truly state-of-the-art, and is the "method of choice" of the music industry.

## Exceptional Product

The ChipChat Sound Card comes in two different models: The ChipChat Sound-16 with FM for \$199, and the ChipChat Sound-32 with FM and WaveTable for \$259. If you buy the Sound-16 and later decide you want WaveTable, an upgrade is available.

The ChipChat Sound Card is designed and manufactured in the USA and has been subjected to rigorous tests to guarantee a solid and exceptional product.

The ChipChat Sound Card is available direct from ChipChat Technology Group (313-565-4000), and comes with the protection of the 30-day moneyback ChipChat Guarantee.

Ordering information is at the bottom of this page. Further information is at <http://www.ChipChat.com>

## Send messages to wireless pagers from OS/2

Practical App  
for OS/2

Combine the Power of OS/2 with the Freedom of Wireless Messages . . .

**T**HE CHIPCHAT WIRELESS COMMUNICATOR is an exciting software product that sends text messages to pagers directly from OS/2.

ChipChat works with pagers from any paging company, including Airtouch, Ameritech, MobileComm, PageNet, SkyTel and many others.

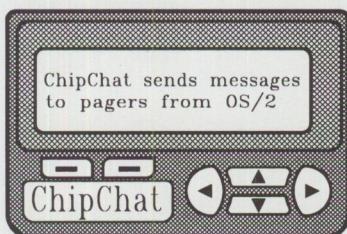
### Remarkably easy to use

ChipChat has an easy-to-use, workplace shell interface. You simply drag a ChipChat Pager object out of a template, configure the settings, and start sending messages!

### Page-Enable your applications

ChipChat can also send pager messages from other applications, including Rexx, and the command line!

ChipChat is ideal for LAN Administrators who want to receive an informative text page when their network needs attention!



### Versatile, Easy, Reliable.

ChipChat is advanced multi-threaded 32-bit object software based on IBM's SOM technology. It's been "through the wringer" with extensive corporate beta testing and has passed a suite of rigorous tests set by IBM. ChipChat is certified as "Ready for OS/2 Warp - NSTL Tested".

Join thousands of customers in the USA and abroad who are successfully using ChipChat for their OS/2 wireless paging needs!

### How much? Just \$79

ChipChat Wireless Communicator is available direct from ChipChat Technology Group for only \$79 and comes with the protection of the 30 day moneyback ChipChat Guarantee.

Ordering information is at the bottom of this page.

Complete information is at the ChipChat Internet Web site:  
<http://www.ChipChat.com>.

### The ChipChat Guarantee

If you're dissatisfied with a ChipChat product for any reason, if it isn't everything we say it is and more, then return it within 30 days for a prompt, cheerful refund.

How to Order  
a ChipChat

**Phone 313-565-4000, Fax 313-565-4001, or Web <http://www.ChipChat.com>**

- ChipChat Sound-16 Card** with advanced FM music; DOS, Windows, and OS/2 support (AIX drivers are optional); CD quality 16-bit sound; 12-channel audio mixer; MPU-401 MIDI; Dual joystick port. (Can be upgraded to include WaveTable). **\$199.**
- ChipChat Sound-32 Card** - all the features of the ChipChat Sound-16 PLUS Incredible WaveTable music. **\$259.**
- ChipChat Wireless Communicator** software with the easy-to-use workplace shell interface, powerful command line interface, ability to 'Page-Enable' your applications, and ability to 'Page Enable' your Internet WWW site. **\$79.**

We accept Visa, MasterCard, and American Express. Add \$10. for shipping.

© Copyright 1995 **ChipChat Technology Group**, 24224 Michigan Avenue, Dearborn, Michigan 48124 USA  
ChipChat-Japan, Koga, Fukuoka Japan, phone: 81-(092)-943-0798 fax: 81-(092)-944-2253



Circle #22 on reader service card.

# NOTES IS WORKING.

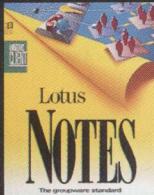
Today, Lotus Notes®

helps organizations of all sizes

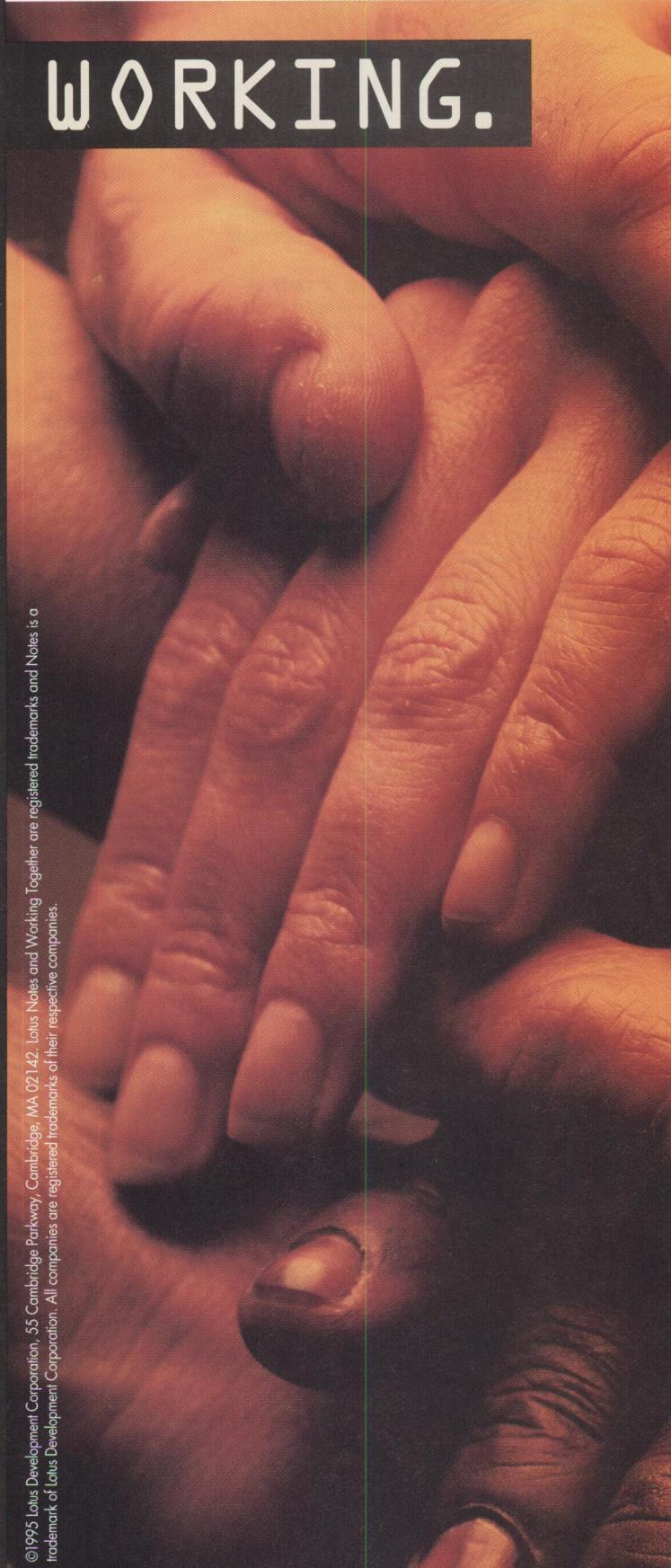
coordinate critical business information. To get the right products to market faster.

To get salespeople the information they need to close the deal. To streamline processes like new drug approvals, mortgage loan processing and health care delivery.

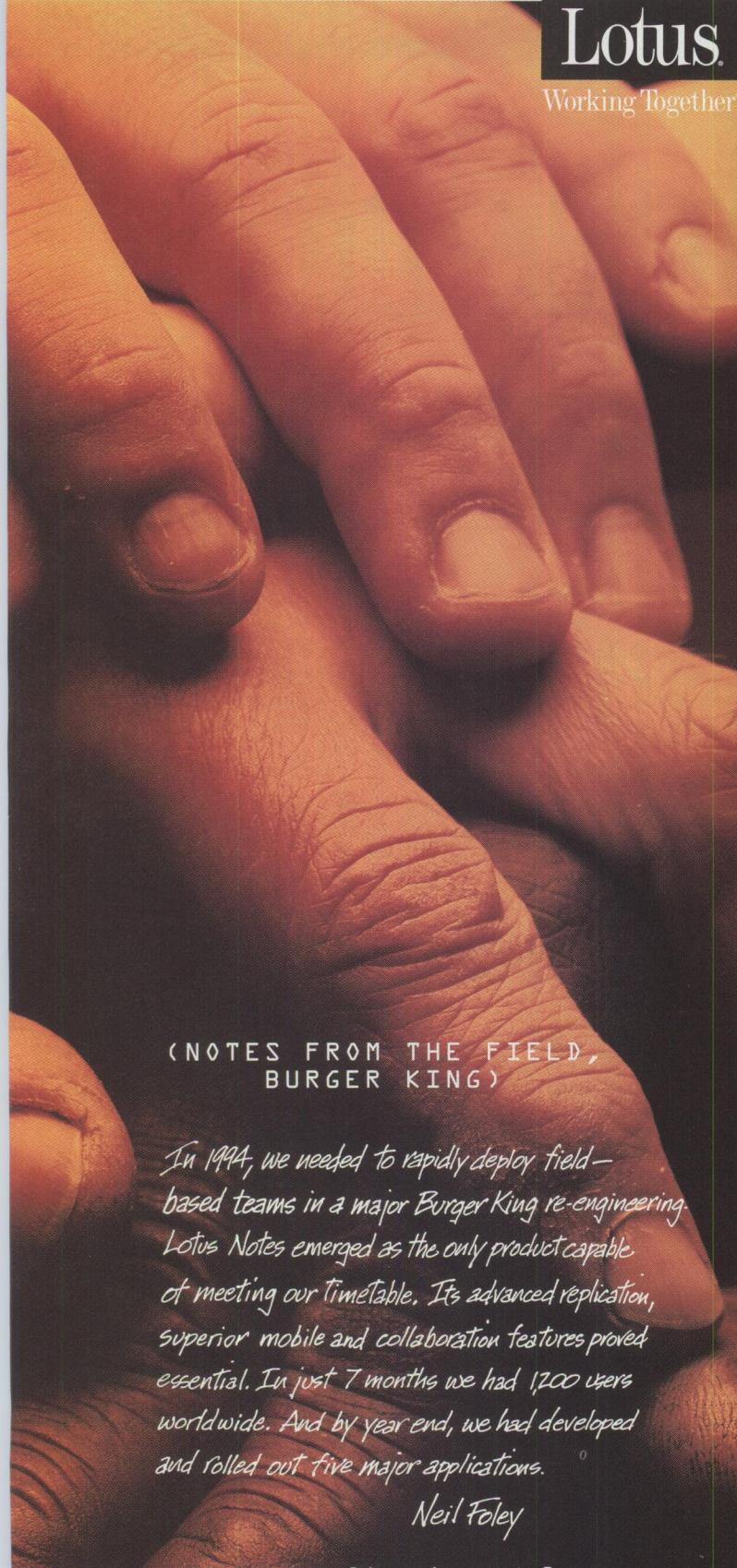
Notes™, and only Notes, gives you access to all the information you need - whether it's in e-mail, a relational database or host system, your favorite desktop



©1995 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. Lotus Notes and Working Together are registered trademarks and Notes is a trademark of Lotus Development Corporation. All companies are registered trademarks of their respective companies.



For more information on Lotus Notes or for a copy of The Book on Groupware, call 1-800-828-7086 ext. B479 (1-800-GO-LOTUS in Canada). Or explore Lotus on the World Wide Web at [www.lotus.com](http://www.lotus.com).



# Lotus.

Working Together®

application, or even on the Web. And Notes' unique replication technology lets you be part of the team, even when you're traveling. That's because Notes is the only proven, open platform for communicating, collaborating and coordinating mission-critical business processes.

Your people work around the clock. They work around the world.

They're working on the future of your business.

Shouldn't Lotus Notes be working for them?

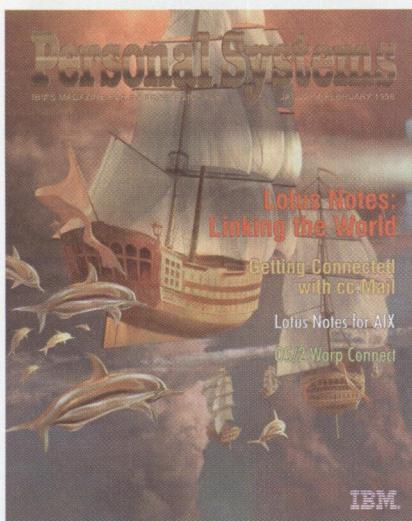
(NOTES FROM THE FIELD,  
BURGER KING)

*In 1994, we needed to rapidly deploy field-based teams in a major Burger King re-engineering. Lotus Notes emerged as the only product capable of meeting our timetable. Its advanced replication, superior mobile and collaboration features proved essential. In just 7 months we had 1,200 users worldwide. And by year end, we had developed and rolled out five major applications.*

*Neil Foley*

Director, Distributed Systems,  
Burger King Corporation

Circle #23 on reader service card.



## ABOUT THE COVER

Noted Dallas artist Bill Carr uses Todd Watson's analogy of 18th century global mercantilism to illustrate this issue's cover. The basic need to communicate has driven civilizations for centuries to identify ever more efficient ways to communicate. This issue of Personal Systems focuses on Lotus Notes—enabling you to link to the world!

## Personal Systems Advertising Representatives

Personal Systems accepts paid advertising for applications, products, or services that run on or complement IBM's personal computer hardware and software products. To obtain a media kit and advertising rate information, contact one of the *Personal Systems* advertising sales representatives at the address below.

**Lewis Edge & Associates, Inc.**  
366 Wall Street  
Princeton, NJ 08540-1517  
(800) ADS-4PSM

Winfield Boyer ..... Ext. 124  
Lewis Edge, Jr. ..... Ext. 123  
George Halo, Jr. ..... Ext. 126  
Joseph Tomaszewski ..... Ext. 125

Fax (609) 497-0412  
CompuServe 72457,3535  
Internet l\_edge@netins.net  
MCI Mail 275-0987  
Voice (609) 683-7900



Printed on recycled paper and may be recycled.  
Printed in U.S.A.

# Contents

## FOCUS

8

### What's New?

This issue's product reviews cover several products complementing Lotus Notes, including applications to handle customer and account management, share documents in workgroups, make electronic messaging accessible, and connect remote users and support centers. Other reviews feature document imaging, OS/2 utilities, OS/2 desktop management, Internet tools, and much more.

22

### Tape Backup Products for OS/2

Bob Angell, principal with Applied Information & Management Systems, reviews four products in his search for a small computer system interface (SCSI)-based tape backup solution for his company and his clients. This article documents the features and advantages of each product.

27

### Fault Tolerance for LAN Server

OS/2 product manager for Vinca Corporation Randall Johnson discusses the importance of data security and availability in corporations today. The author shows how a small investment in a fault-tolerant system can significantly reduce lost productivity due to server downtime.

## TECHNICAL

38

### Designing Lotus Notes Applications That Perform

Those of us encountering applications that work just fine in limited test environments but subsequently provide unacceptable performance under a full load know that it is less painful to do the necessary design work up front, rather than redesign an application already in use. This article, based on experience with Lotus Notes Release 3, recommends ways to design applications for the best performance right from the start.

42

### Designing a Scalable Lotus Notes Workflow Application

When designing a Lotus Notes application, the ability to handle large amounts of data becomes a critical concern. This article highlights some relevant issues and describes the application that the author designed and implemented for an international hotel chain using Lotus Notes Release 3.

46

### Lotus Notes for AIX in a Personal Systems Environment

Lotus Notes for AIX servers may make sense in a PC environment where increased server capacity is needed or improved administration and management is desired. After providing a brief overview of RISC System/6000 processors, describing AIX (IBM's version of UNIX), and listing the software and hardware prerequisites for Lotus Notes for AIX, this article shows how AIX Notes servers might fit into such an environment and provides tips for getting started with Lotus Notes for AIX.

## LITTLE SOLUTIONS

75

### Questions and Answers

This issue features answers to frequently asked questions about Lotus Notes.

*IBM Personal Systems Technical Solutions* is published bimonthly by Personal Systems Competency Center, International Business Machines Corporation, Roanoke, Texas, U.S.A. Send any correspondence and address changes to *Personal Systems* at:

IBM Corp. Mail Stop 40-B3-04  
One East Kirkwood Blvd.  
Roanoke, TX 76299-0015

*Personal Systems* can be found on the Internet's World-Wide Web at: <http://pscc.dfw.ibm.com/psmag>

IBM customers are eligible to receive the magazine free of charge and can request subscription information by mail or Internet, or by faxing a request to (817) 961-7218.

© Copyright 1996 International Business Machines Corporation

## 30

### Getting Together with cc:Mail

With nearly seven million mailboxes worldwide, cc:Mail is the world's most popular LAN-based electronic mail package. This article discusses the reasons behind this success, details cc:Mail's unique architecture, and includes a brief history of the product's evolution.

## 33

### Sales Force Automation: Building the Intelligence-Driven Sales Organization

Mei Mo, director of consulting at IntellAgent Control Corp., describes the implementation of the IntellAgent Control System in Sanwa Business Credit Corp.'s Vendor Financing Division. This article shows how Sanwa's sales force became more productive and thus more effective through the power of customer relationship management.

## 36

### The New Mercantilism

Todd Watson presents a cosmic view of the marriage of IBM and Lotus, comparing the relationships of 18th century merchants with the communications channels of today's Internet.

## 54

### New Administrative Features and Enhancements in Lotus Notes Release 4

Lotus Notes Release 4 has many powerful tools to ease the deployment of Notes and help you manage administrative tasks quickly and easily through automation. This article introduces some of the many new features and enhancements in Lotus Notes Release 4 that make Notes administration easier.

## 59

### MQSeries link for Lotus Notes

IBM MQSeries link for Lotus Notes is a new function of IBM's MQSeries product. It connects Lotus Notes applications with new or existing applications on any of 18 software platforms. This article describes the need for this function, gives a detailed sample application, and explains its inner workings.

## 66

### Getting Warped and Connected Too!—Part Two

This article, the second part of our review of OS/2 Warp Connect, looks at the different applications that OS/2 Warp Connect provides to make use of your connections, including the transmission control protocol/internet protocol (TCP/IP) suite of applications and the new IBM OS/2 Peer.

## 77

### Corrective Service Information

Refer to this section for the latest maintenance release levels and other software service information.

#### Editor and Publisher

Betty Hawkins  
(817) 961-7525  
[bhawkins@vnet.ibm.com](mailto:bhawkins@vnet.ibm.com)

#### Assistant Editor/ Reprint Coordinator

Lia Wilson  
(817) 961-6267  
[lia@vnet.ibm.com](mailto:lia@vnet.ibm.com)

#### Business Manager/ Circulation Manager

Van Landrum  
(817) 961-6436  
[vlandrum@vnet.ibm.com](mailto:vlandrum@vnet.ibm.com)

#### Editorial Assistant

Jeffrey Miller  
(817) 961-6433  
[jeffreym@dalvm41b.vnet.ibm.com](mailto:jeffreym@dalvm41b.vnet.ibm.com)

#### Subscription Manager

Rose McAlister  
(817) 961-7008  
[rmcalister@vnet.ibm.com](mailto:rmcalister@vnet.ibm.com)

#### Database Administrator

Sharonda Walker  
(817) 961-6269

#### Publication Services, Typesetting, and Design

Terry Pinkston/Corporate Graphics  
Arlington, Texas

#### Illustrator

Bill Carr  
Dallas, Texas

#### Printing

Dave Willburn/Motheral Printing  
Fort Worth, Texas

#### Editorial Services

Mike Engelberg/Studio East  
Boca Raton, Florida

#### Executive Publishers

Beau Sinclair and Jim Moore

Copying or reprinting material from this magazine is strictly prohibited without the express written permission of the editor. Titles and abstracts, but no other portions, of information contained in this publication may be copied and distributed by computer-based and other information service systems.

# What's New?

## Adding Function to Lotus Groupware

 Veritas Technologies, Inc., a Lotus Notes professional developer and premium business partner, has released version 2.0 of its Lotus Notes-based IntellAgent Control. IntellAgent Control is the hub of Veritas' **IntellAgent Control System**, a series of Lotus Notes-based applications that handle customer and account management, contact management, account planning, opportunity forecasting, and task management, such as:

- Automating field force actions and communications
- Sharing information about accounts, tasks, opportunities, and projects
- Rolling relevant data up and down the organization
- Tracking action items from commitment to completion
- Viewing and analyzing current data collected and entered anywhere, anytime

The IntellAgent Control System allows you to consolidate, share, and manage sales, marketing, and customer service information. It includes IntellAgents, a software utility that links external data sources to the IntellAgent Control System.

Version 2.0 includes a number of enhancements and improvements to make the system even more effective in managing customer and prospect information, including an improved user interface, enhanced account planning and opportunity management, and a task and project manager.

For more information, circle 1 on the reader service card. Also see the article "Sales Force Automation: Building the Intelligent-Drive Sales Organization" in this issue.

## Workgroup Sharing for Lotus Notes

 **OfficeLink for Lotus Notes** from Brainstorm Technologies, Inc. lets **Microsoft Office** users store, organize, and distribute **Word** and **Excel** documents within workgroups using **Lotus Notes**. While working in Word and Excel, without ever leaving the Office interface, you can seamlessly open, edit, and save documents directly from any Notes database.

By leveraging Lotus Notes' strengths, such as its unique replication technology and robust security features, OfficeLink enables seamless and reliable information sharing throughout the company, as well as by suppliers and customers around the globe. The ability to easily access Office documents outside an organization allows mobile users such as field sales representatives to maximize their current investments in remote Notes connectivity software.

OfficeLink's features help you:

- Reduce corporate Lotus Notes training costs because users continue working in familiar MS-Word or Excel environments
- Leverage Notes replication for document management and distribution
- Ensure corporate level security for critical information
- Save money and time by centralizing documents in Notes databases

For additional information, circle 2 on the reader service card.

## Electronic Messaging

 **WorldLink Desk**, from CompLink Ltd., makes electronic messaging accessible to everyone through its intuitive interface, a simulated paper document environment. By presenting users with a familiar paradigm for sending mail "in real life,"

WorldLink Desk reduces training time and costs for the first time e-mail user. It also saves the cost of re-coding custom applications to make them mail ready. Your time-tested, custom application can now go directly to **Lotus Notes** or **cc:Mail** without revision.

Generate a message using your favorite application, then let WorldLink Desk stuff it in an envelope, present you with an easy-to-use point-and-click address book, and send your mail on command. If you are using a high powered MAPI- or SMI-compliant application, simply select the send option that WorldLink Desk conveniently places in the File menu. If you are using an old style or custom application, simply print to the installed WorldLink printer. Up pops the universal envelope, ready to address.

Click on the Address Book to select individual recipients, a recipient list, or even address it on the fly, and your message is ready to send. Forgot a file? Want to add an attachment? The File Cabinet brings you into your desktop file manager. Once there, finding and selecting add-on documents is as familiar as using Windows.

The receive side is just as easy. WorldLink Desk simplifies message review with its unique auto-association facility. Select a message-part and WorldLink Desk automatically launches the compatible viewing/editing utility. You can even review, modify, and include your messages from within any application.

For additional information, circle 3 on the reader service card.

## Advanced Connectivity for OS/2 Warp Connect

 IBM's **AttachPak for OS/2 Warp Connect** provides a broad set of advanced connectivity capabilities, including a **Lotus Notes Desktop** trade-up from **Lotus**



# ONE PICTURE IS WORTH A THOUSAND WORDS.

*"No one who sees it will want to do without it."* - Nicholas Petreley, InfoWorld

for  
OS/2

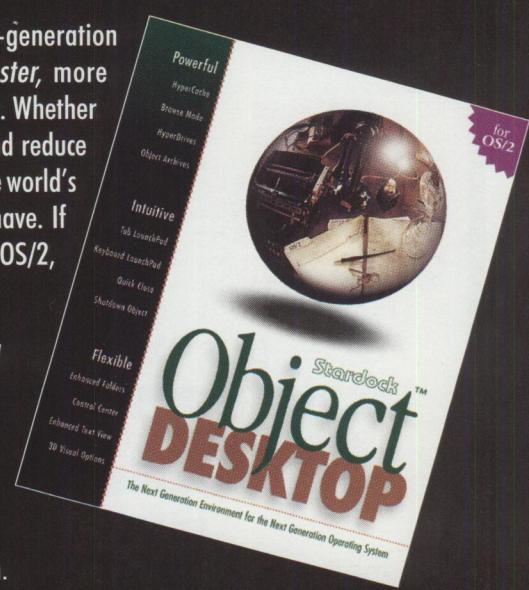
**Object Desktop turbo-charges OS/2.** It is the next-generation desktop environment that makes your OS/2 system *faster, more powerful, easier to use, and well, just plain nicer to look at*. Whether you are an IS manager looking to increase productivity and reduce training costs, or an end user looking to get the most out of the world's best 32-bit PC operating system, Object Desktop is a must-have. If you have OS/2, you should have Object Desktop. If you don't have OS/2, now there's an exciting new reason to *upgrade* to it.

*The Next Generation Environment for the Next Generation Operating System!*



Phone: 313-453-0328  
Fax: 313-453-1480  
WEB: <http://oeonline.com/~stardock>  
Email: [stardock95@aol.com](mailto:stardock95@aol.com).

Circle #6 on reader service card.



**Notes Express**, that creates an enhanced enterprise solution for medium and large corporate customers.

OS/2 Warp Connect offers a full set of integrated networking capabilities and software that provides peer and remote connections along with transmission

control protocol/internet protocol (TCP/IP) for dial-up and local area network (LAN) access to the Internet, provides access to the most popular online services, and includes Lotus Notes Express. AttachPak builds on OS/2 Warp Connect's foundation to provide advanced connectivity and groupware capabilities

that many businesses require. AttachPak offers:

■ **Lotus Notes Desktop**—Designed for organizations that want a cost-effective way to deploy corporatewide applications. Notes Desktop is a Notes runtime client that lets you use Notes applications, plus it includes 25 application templates such as customer tracking, document library, and workflow. Additionally, Notes Desktop enables you to leverage Notes' unique groupware capabilities, including compound document management, mobile support, replication, and robust security.

■ **IBM Personal Communications/3270 for OS/2 Entry Level**—Allows communication between desktop users and mainframes. This emulation capability increases your productivity by allowing access to information stored on a host computer within your organization.

■ **Communications Manager/2 SNA Application Environment**—Allows computers to exchange data with systems using the advanced program-to-program communication (APPC) protocol, letting you access information from a mainframe or workstation.

■ **Mobile File Sync**—Allows LAN clients to disconnect from the network and still work with cached files from the server. When the client is reconnected, mobile and server files are synchronized. This ensures that you are working with the most current version of your data.

■ **Performance monitoring**—Allows a network administrator to determine if a computer is running at peak efficiency. **System Performance Monitor/2** helps identify and solve OS/2 systems performance issues via data collection, recording, graphing, reporting, and analyzing facilities for a single workstation.

Additional features include a **Distributed Computing Environment (DCE) Client**, a Dial-in-Access-to-LANs (DIALS) client that allows remote LAN access using an **IBM 8235 Server**, and **AnyNet Sockets for OS/2** to support protocol independence for socket applications. AnyNet Sockets for OS/2 allows these applications to run on NetBIOS, IPX, or SNA networks. AttachPak also provides **NetView Distribution Manager/2**.

# UniteObjects

for OS/2 Warp

- **SOM Based**
- **32-bit APIs** accessible from C, C++, VX-REXX™, VisualAge™...
- **Beta OpenDoc™** Unite parts included



**Unite® Scanner Object**  
Add color, grayscale and bitonal scanning to your applications. Elegant interface supports personal to 110 PPM scanners.

**Unite® Image Viewer Object**  
Add image viewing, manipulating and faxing to your applications. Compatibility with many file formats.

**Unite® Storage Object**  
Storage and retrieval for optical and CD-recordable jukeboxes. Multi-threaded design for superior performance. OS/2 Warp device drivers included.

Cirrus Technology, 5301 Buckeystown Pike, Frederick, Maryland 21704

**1-800-272-1135**

Circle #5 on reader service card

## NDP Fortran F77 or F90...It's Still the Best! Pentium, Alpha, i860 and 486

**NDP Fortran** was the first 32-bit globally optimized Fortran to run on a PC. Running large programs? We support demand paging on DOS and **DPMI** based Windows DOS Boxes. In OS/2 and DOS we include bit map and **vector graphics** libraries. Our Pentium Scheduler runs on F77, F90, C/C++ and on all OS's, while our Alpha and i860 compilers feature **Superscalar** and **Supervector** optimizations. In fact, the simple DSP and vector primitives generated by our **micro vectorization** technique beat the other Alpha Fortran compiler by a factor of 3 - we hit 88 megaflops running vector products on a 150 MHz Alpha! And, some of the RISC techniques we use on vector machines work for the Superscalar Pentium.

NDP Fortran continues to thrive because of its ability to compile and run legacy codes. It includes 99% of the **VAX/VMS** extensions, and they work! One user who tried to move his VAX codes to NT gave up, declaring that the other NT Fortran was a toy. He bought a copy of NDP and was up and running in a week. We also make **i860** and **Alpha** powered EISA coprocessors. Our last **GigaCube** went out the door with 24 i860s and runs at 1.9 gigaflops. Whatever your needs, **LAPACK**, **IMSL**, **NAG**, FFT's, Neural Nets, etc., we have it along with a fix for the **Pentium FDIV bug**. Call 508 746 7341 for our White Papers on OS/2, Pentium Numerics and Alpha Scheduling now.

**DOS, OS/2, Unix, NT and OS/F**

# Microway®

Circle #24 on reader service card

(NVDM/2) Start Up, which downloads the NVDM/2 client that is licensed separately. This NVDM/2 client permits software distribution on a network.

## Remote Customer Support



Repository Technologies Inc. (RTI) has announced the *CustomerFirst Notes*

**Remote** option, which lets organizations use *Lotus Notes*' database distribution capabilities to connect remote users and support centers to the CustomerFirst support system. In-house help desks can use Notes to provide solutions to their users and to expedite problem reporting, thereby increasing productivity and reducing calls to the support staff.

CustomerFirst is a comprehensive customer support software package that provides complete control of the support process from the time a user calls with a question until a fix is ultimately incorporated into the product. The product maintains a central database of incidents and solutions. To implement the Notes Remote option, a database administrator within

the user organization simply sets the rules for incidents to be downloaded.

Individual authorized users download the database subset as needed. They can then access information on resolved problems, check the status of open incidents, enter new incidents, and make new entries for incidents encountered by other users. Periodically, remote users' entries are replicated to a Notes database at the host site and then uploaded to the master CustomerFirst database.

For more information, circle 4 on the reader service card.

## OpenDoc Now in Unite Object



Cirrus Technology, a corporation specializing in document imaging and storage management technology for the OS/2 environment, has announced that each **Unite Object** (*Image Viewer*, *Scanner*, and *Storager*) includes a beta OpenDoc part. OpenDoc technology provides a new model for software interoperability by

enabling the creation of distributed, cross-platform component software.

Unite Objects provide OS/2 developers and integrators document imaging and storage management capabilities including image view, manipulation, object storage, CD-ROM creation, and jukebox management. As these objects become OpenDoc parts, you can take advantage of all of OpenDoc's benefits and features in addition to using production-proven Unite technology. The current Unite Objects are used with development environments such as *C/C++*, IBM's *VisualAge*, and Watcom's *VX-REXX*.

Unite Image Viewer and Unite Scanner, which provide you with the capability of scanning, viewing, and manipulating bitonal, gray scale, and color documents and faxes, are now compatible with IBM's VisualAge C++ for OS/2. This allows you to integrate Image Viewer and Scanner's powerful functionality into your *Visual Builder* application. The Unite Object part can be added to the tool palette and used like any other Visual Builder part.

**IF YOU KNOW OS/2® YOU SHOULD KNOW INDELIBLE BLUE**

**Guidelines**  
by JBA International



Guidelines is a 32-bit visual application development tool for building OS/2 PM GUI applications, with complete ADE to manage all source files, resource files, resource scripts, make files, etc. Supports IBM C Set++, Borland C++, and Watcom C++. Support is available for DB2/2 & other database libraries.

**JBA53 Guidelines v3.1 Base PDK**  
MSRP \$595.00      **\$535.00**

**JBA57 Database Connectivity**  
MSRP \$395.00      **\$355.00**

**The DeskMan / 2™ Productivity Pack**



**\$74**  
from  
**Development Technologies, Inc.**

DevTech, maker of the award-winning DeskMan/2, has created the powerful DeskMan/2 Productivity Pack. Combined with DeskMan/2 v.1.51 (and a free upgrade to v.2.0, when available), an outstanding selection of invaluable OS/2 utility products, and money-saving coupons for product upgrades. The Productivity Pack includes: DeskMan/2, DCF/2 Lite, The Graham Utilities\*, Relish v2.12, & CPU Monitor Plus\*. (\*Special version created exclusively for this package)

**DEV50 MSRP \$99.95**      **Save \$25.95**

**NetPM for OS/2**  
by Creative Assistance Software

Fast LAN Server 3.0/4.0 (and Warp Server) management locally and remotely, even from Warp Connect Peer Servers. Performance monitoring and domain configuration reports.

**CS443 MSRP \$289.00**      **\$289.00**

**THE SINGLE SOURCE FOR OS/2 SOLUTIONS**

**TE/2**  
by Oberon Software

This full-featured general purpose telecommunications program and terminal emulation package was designed from the ground up to harness the power of OS/2.

**OBE10 MSRP \$49.95**      **\$49.00**

**CALL FOR NEW 64 PAGE FULL COLOR CATALOG!**

**Visit our web site:**  
<http://www.indelible-blue.com/ib>




**1-800-776-8284**

Circle #17 on reader service card

PERSONAL SYSTEMS • JANUARY/FEBRUARY 1996

11

For more information, circle 5 on the reader service card.

## Utilities for OS/2



**OS/2 Essentials 1.1**, from

Stardock Systems, is a mini-utility suite that supplies OS/2 with features such as a screen saver, a powerful file manager, a task bar, and numerous other utilities and applications.

This new version of OS/2 Essentials improves upon an already strong suite of applications. The screen saver now supports full screen DOS and Windows sessions and improves upon its "green" monitor support. Its security features for corporate users are now easier to use. The file manager improves on its already significant speed and greatly improves its stability on a wide array of hardware configurations. With OS/2 Essentials, you no longer must buy separate, expensive products to get the functionality you need.

For more information, circle 6 on the reader service card.

## Advanced OS/2 Desktop Environment



Also from Stardock Systems, **Object Desktop** is an advanced desktop environment that "turbo-charges" OS/2, improving the system's performance, flexibility, and ease of use.

Object Desktop enhances the existing OS/2 environment with updated icons, frame controls, and command buttons; plus it adds new tools designed to boost productivity and system performance. The new features include the Object Navigator, Control Center, Keyboard LaunchPad, Object Archives, HyperDrive, and HyperCache features.

The Tab LaunchPad helps you organize programs, data objects, and tasks using named tabs. The Control Center offers virtual desktops for organizing running applications and minimizing window clutter. In addition, the Control Center provides an object launcher and real-time resource monitors.

Object Desktop boosts performance with HyperDrive, a feature that reduces the time required to display data object icons

**OnCmd®  
xBase for OS/2™**

Take command with OnCmd®. The native OS/2® xBase Database Development Environment.

Another fine product from On-Line Data 5 Hill Street, P.O. Box 65, Kitchener, Ontario, Canada N2G 3X4  
Phone (519) 579-3930 Fax (519) 579-2130 Compuserve: 70022,104 Internet: oncmd@onlinedata.com

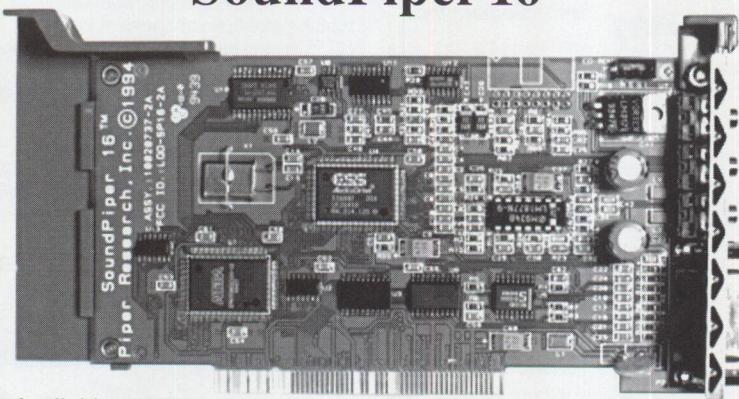
On-Line Data recognizes the following trademarks: OS/2 (IBM Corporation); FoxPro (Microsoft Corporation); dBase (Borland International Inc.); Clipper (Computer Associates International Inc.).

FOR MORE INFO, FAX THE HOTLINE: 519-579-2130

Circle #25 on reader service card

## Now there's industry standard sound for your PS/2!

### SoundPiper 16™



- ✓ Available now
- ✓ Only \$199.95\*
- ✓ DOS, Windows™ & OS/2® compatible

Major credit cards accepted.

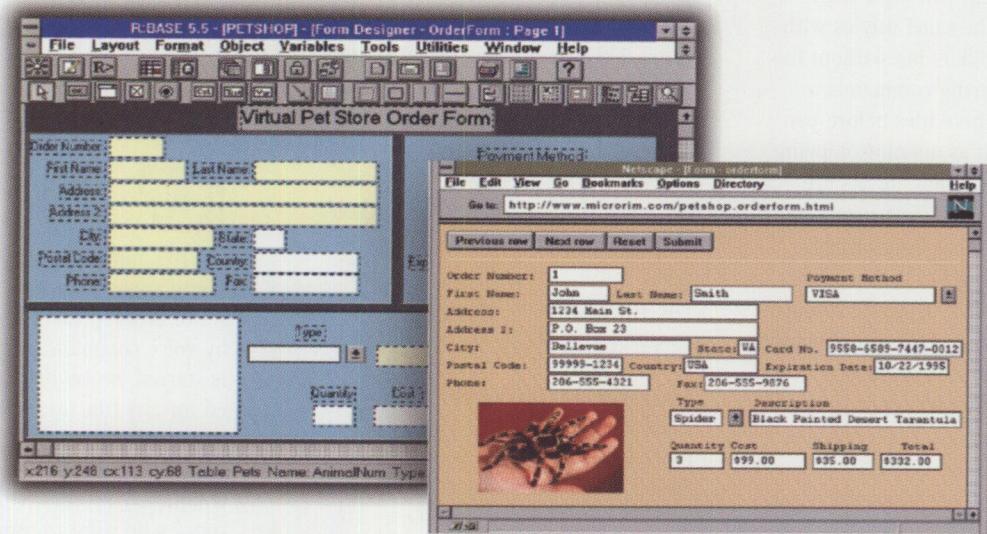
**PIPER Research**  
Incorporated

4716 Nord Drive • Minneapolis, MN • 55437  
Tel: (715) 386-7899 FAX: (612) 881-5840

\*Plus shipping & handling. ©1995 Piper Research, Inc. SoundPiper 16 is a trademark of Piper Research, Inc. Other trademarks are owned by their respective companies.

Circle #26 on reader service card

# It's so easy we could have called it "Your:WEB"



R:WEB - the first easy-to-use, affordable Internet database solution.

**CREATE DOCUMENT**

Making a database accessible to visitors of your Web site used to take a good understanding of scripting and a fair chunk of change. Not any longer. Now you can use R:WEB to effortlessly create forms for data exchange between your Web site and your database. R:WEB writes the code - you don't need to know HTML, CGI or PERL scripting. And your database can reside in any ODBC-compliant data source for R:WEB to dynamically link to it. R:WEB maintains security over your sensitive information through data integrity rules, constraints and password security - you have complete control over the information a Web browser can or cannot access. Best of all, R:WEB is built on the powerful R:BASE engine, one of the most respected database engines available. And, oh yeah, did we forget to mention? It's affordable.

So make your Web site work harder the easy way. With R:WEB. And check out the FREE CD-ROM offer.

<http://www.microrim.com>

**MICRORIM®**

A Subsidiary of Abacus Software Group  
15395 SE 30th Place, Bellevue, WA 98007  
(206) 649-9500

R:WEB available through your local reseller or distributor.

Copyright © 1995 Microrim, Inc., a subsidiary of Abacus Software Group. All rights reserved. R:BASE, R:WEB and Microrim are trademarks and registered trademarks of Microrim. Microrim reserves the right to change product and services offered at any time without prior notice.

**FREE  
CD-ROM**

If you're responsible for Web site management,  
we'll send you a **FREE CD-ROM** with  
sample R:WEB software.  
Just call **1-800-628-6990**,  
ext. 130



Circle #27 on reader service card.

by making a "best guess" at file types. By storing folder contents in RAM, the HyperCache feature speeds up the display of folder views. One of the most impressive folder performance improvements is Browse Mode, which displays a subfolder's contents in the parent window. Less memory is used and desktop clutter is minimized because new windows are not opened each time a nested folder is opened.

Object Archives help you work with compressed files the same way as with Workplace Shell folders but without the extra steps of entering commands to archive and unarchive files before performing tasks such as opening, copying, or saving the files. When objects are stored in an archive, compression and decompression tasks are performed automatically. Object Desktop provides disk compression that uses safe compression standards. You can view and manipulate data from within archives and, in many cases, run programs directly from archives.

The Keyboard LaunchPad provides a fast way to configure keys for opening any object. You can launch a command-line command by associating an OS/2 window with Ctrl+Alt+Spacebar or other keyboard sequence.

For more information, circle 6 on the reader service card.

### Anti-Virus Toolkit for OS/2



#### *Dr. Solomon's Anti-Virus*

*Toolkit* from S&S Software International Inc. introduces a 32-bit Presentation Manager user interface, installer, and memory-resident anti-virus scanner to help **OS/2**, **OS/2 Warp**, and **OS/2 Warp Connect** users detect and kill the 6,500 known—and even unknown—viruses that threaten their desktop and network computers.

The Toolkit installs quickly and easily and runs not only under all versions of OS/2 but also under **LAN Server** and **LAN Manager**. It includes **Dr. Solomon's Anti-Virus Toolkit** for DOS to prevent native OS/2 applications from being fooled by DOS stealth viruses. If you're

currently using another anti-virus product, the Toolkit also includes a set of utilities to help you remove it.

The Toolkit is easy and flexible to administer. Its intuitive Presentation Manager interface features familiar dialog boxes and pull-down menus that streamline option selection. Through OS/2's multitasking ability, the toolkit can run transparently in the background, providing automatic virus checks without disrupting your applications or requiring your intervention.

For additional information, circle 7 on the reader service card.

### Voice Command Tools



#### Taking advantage of IBM's *VoiceType Dictation* technology and OS/2 Warp's multitasking, multithreading power, Voice Pilot

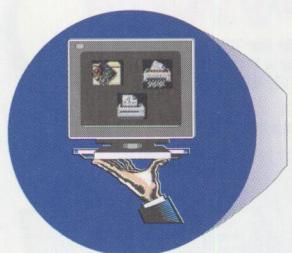
Technologies, Inc. offers **Voice Pilot**, a set of desktop tools operated completely by voice command. Once the application is started, no keyboard or mouse is needed for any function of the program. All command and control, text entry, number entry, and free-form dictation is done completely by voice command. (For those who want to use the keyboard or mouse, data can still be entered the "old-fashioned" way.)

Voice Pilot contains the following easy-to-use modules:

- **Calendar**—Plan and schedule any date- and time-dependent events. It gives full descriptions of the date, time, meeting place, type of event, person(s) to be met, and comment fields for each event.
- **To-Do List**—Schedule and plan all date dependent events. It provides start dates, due dates, priority sorting, and event and conclusion free-form descriptive data fields.
- **Address Book**—This complete business and personal address book includes all information needed to add, edit, find, or recall a person or company that you want to contact.
- **Memo Pad**—Dictate brief memos or letters, which you can then print, fax, or forward by e-mail.
- **NotePad**—This electronic "post-it" note pad system lets you make "stream-of-consciousness" notes to yourself at any

## Lock and Load!

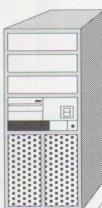
Create, Deliver and Secure OS/2 Desktops over any LAN!



### Desktop Commander

A Complete Solution To OS/2 Desktop Control

- Easily take a picture of user's desktops and store it centrally!
- Standardize any group of workstations or allow users to have their own Desktop wherever they log in!
- Restrict right mouse button options!
- Restore lost or changed desktops instantly!
- Security upgrade available!



### Desktop Observatory

A Complete Solution To OS/2 Desktop Security

- Same benefits of the Desktop Commander and more!
- Password protect objects and applications...even the Launch Pad!
- Take background tasks off the Window List!
- Create Security/Audit Logs!
- Drag and Drop File Encryption!
- Prevent Cntl-Break and Alt-F1 access!
- Inhibit unauthorized file access!
- Prevent clever users from building unauthorized objects!

Information 800.525.1650



© 1995 Pinnacle Technology, Inc. • PO Box 128, Kirklin, IN 46050 • 317.279.5157  
OS/2, OS/2 Ready!, OS/2 WARP and Ready for OS/2 WARP are trademarks of the IBM Corporation. © 1995 Pinnacle Technology, Inc. All Rights Reserved.

Circle #28 on reader service card

# SEAMLESS COLLABORATION!

Get IT together with MQSeries

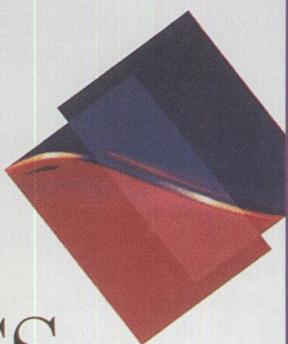
IBM



## MQSeries

Now, with CICS you can

IBM

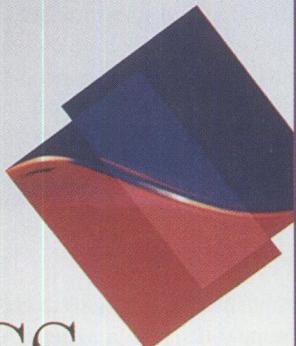


## CICS Client for OS/2

Version 1.0 3.5" Disks

Now, with CICS you can

IBM



## CICS for OS/2 • Single-User

Version 2.0.1 3.5" Disks and CD-ROM

*Now, Lotus Notes and Your Legacy Applications  
Can Communicate in Perfect Harmony. Now, You Can  
Integrate "Incompatible" Platforms and Applications  
Into a Single Coherent System for Notes Users.*

**IBM® MQSeries and CICS Make it all Possible**

**IBM® MQSeries** Now you can provide Notes enabled workstations access to information residing on legacy or other non-Notes systems – without standing on your head. The solution is MQSeries along with MQSeries Link for Lotus Notes\*—the messaging software that links Notes users with transactions systems, or any other applications, in a seamless working environment. IBM MQSeries combined with MQSeries Link for Lotus Notes\* puts key information at the fingertips of Notes Groupware users – greatly increasing effectiveness and productivity. And MQSeries performs its magic while neatly side-stepping the problems inherent in terminal emulation, direct access and staged data technologies.

**IBM CICS** More magic! If you think of CICS as just a transaction processor, here's a surprise. CICS is also a true application server with the power to provide client/server solutions across multiple platforms and operating systems. For instance, CICS along with CICS Link for Lotus Notes\* will open the doors to allow your Notes workstations to communicate and cooperate with the other applications, platforms and systems in your enterprise. The benefit is significant—a better informed, more productive workforce. CICS servers are available for OS/2, Windows NT, AIX, AS/400, VSE/ESA, MVS/ESA and HP/UX. Versatile CICS clients are offered for OS/2, DOS, Windows and Macintosh. And the family is growing!

\*Purchasers of MQSeries and/or CICS full packages can download IBM Support Packs—which include the link for Lotus Notes—from the following internet address:  
<http://www.hursley:ibm.com/cics/tppacs.html>.

**Special Promotional Pricing In Effect!**  
Please call for pricing or Information Kit  
Call Softmart toll free today: 800-328-1319

**Softmart, Inc.** is a leading provider of software and support services. Our procurement capabilities and technical services help you increase productivity and maximize the return on your organization's technology investment.



Circle #29 on reader service card.



**IBM**  
Software  
Advantage  
Provider  
Call Softmart for details  
on this new program.

time and have the computer print them out at a later time.

For additional information, circle 8 on the reader service card.

## Managing Networked PCs



**CleverManage 1.0**, a desktop systems management product from CleverSoft, lets you easily and effectively manage networked PCs.

CleverManage significantly reduces the cost of managing the client/server environment by employing an exceptionally easy to use, yet powerful, task-oriented user interface. For example, with a single click of a button, you can update configuration files on hundreds or thousands of machines. CleverManage features include asset management, software distribution, application metering, configuration management, centralized problem diagnostics,

problem prevention, automatic correction, simple network management protocol (SNMP) integration, and many others.

Going beyond traditional systems management products, CleverManage not only manages network and system resources, but also manages applications. It displays a real-time map of all applications running on every machine in the network, allowing you to examine the state of an application, start or stop applications, and perform other diagnostics.

CleverManage is designed to integrate with popular network management products such as IBM's *NetView/6000*, HP's *OpenView*, and many others using the industry standard SNMP protocol.

Designed for LAN users who are always connected to a company's network, as well as for those who occasionally log in from remote locations, CleverManage offers a highly flexible software distribution approach. Using powerful rules, CleverManage can accommodate unique configuration differences that exist between PCs.

For additional information, circle 9 on the reader service card.

## Quick Access to Reusable Components



**ObjectCatalog**, from ObjectSpace, Inc., is a complete, distributed, cross-platform component reuse facility that offers a solution to the problem of locating reusable components. ObjectCatalog helps development teams share information about software, design patterns, frameworks, documents, and other corporate assets.

With a graphical user interface, ObjectCatalog lets you fill out simple questionnaires and define search patterns for finding target entries in local and remote catalogs. Machine entries are then presented graphically according to their degree of similarity to your request.

ObjectCatalog simplifies reuse by:

- Publishing descriptions of classes, frameworks, design patterns, documents, and more
- Automatically publishing C++ and Smalltalk classes

Circle #30 on reader service card

- Creating meaningful, well specified, user defined classifications
- Supporting all development languages
- Creating user defined and persistent search patterns for finding target entries
- Allowing users to track the evolution of components over time
- Searching distributed catalogs

For more information, circle 10 on the reader service card.

### CORBA Development Tool

 With a full and complete implementation of Object Management Group's (OMG's) Common Object Request Broker Architecture (CORBA), IONA Technologies' *Orbix* is now available across 20 operating system platforms, including OS/2 and Apple Macintosh System 7.5.

With Orbix, systems designers can now build applications based on objects running on any operating system (desktop, server, or real-time). Programmers can develop distributed,

C++, object-oriented applications following a consistent and straightforward standards-based model.

For more information, circle 11 on the reader service card.

### Weather CD-ROM

 *Everything Weather*, a new CD-ROM offering a wealth of information, entertainment, and knowledge on the topic of weather, has been released by The Weather Channel. This new multimedia title is a thorough, authoritative resource for answering commonly asked questions about weather. It includes climate data for more than 700 cities, 40 video clips of spectacular weather events, 250 captivating still photographs, and 95 articles, along with maps, animation, and explanations.

Subtitled "the essential guide to the whys and wonders of weather," *Everything Weather* contains interactive activities involving tornadoes, hurricanes, lightning, clouds, and winter storms. Its daily planner, both an appointment

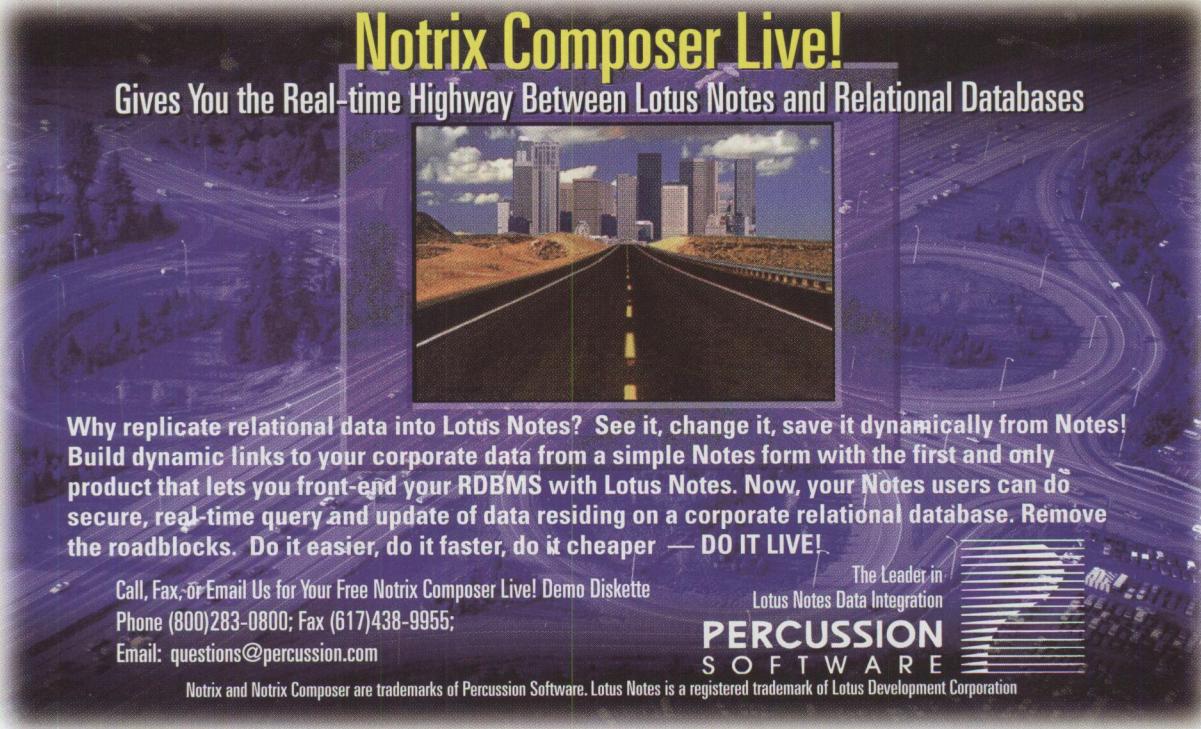
calendar and a weather journal, offers dramatic photos and daily weather facts. A 480-word glossary explains weather-related terms such as jet stream, El Niño, and inversion layer. An online connection can be used to access a current forecast for 200 cities.

You can display a state's average high temperature at any time of the year and use that information to choose a vacation destination. You can enter the map coordinates of a current hurricane and compare its location to the path of some of the most destructive storms of this century, such as Hurricane Andrew. The detailed climate database covers 500 U.S. cities and 200 international cities. Climate maps allow you to compare rainfall, snowfall, temperature, and other data for different destinations.

For more information, circle 12 on the reader service card.

### Multimedia Travel Planning

 *Map'n'Go*, recently named Best New Use of a Computer by Software Publishers Association,



**Notrix Composer Live!**  
Gives You the Real-time Highway Between Lotus Notes and Relational Databases

Why replicate relational data into Lotus Notes? See it, change it, save it dynamically from Notes! Build dynamic links to your corporate data from a simple Notes form with the first and only product that lets you front-end your RDBMS with Lotus Notes. Now, your Notes users can do secure, real-time query and update of data residing on a corporate relational database. Remove the roadblocks. Do it easier, do it faster, do it cheaper — DO IT LIVE!

Call, Fax, or Email Us for Your Free Notrix Composer Live! Demo Diskette  
Phone (800)283-0800; Fax (617)438-9955;  
Email: [questions@percussion.com](mailto:questions@percussion.com)

The Leader in  
Lotus Notes Data Integration

**PERCUSSION**  
SOFTWARE

Notrix and Notrix Composer are trademarks of Percussion Software. Lotus Notes is a registered trademark of Lotus Development Corporation

Circle #31 on reader service card

is a sophisticated multimedia travel planning program that takes the guesswork out of planning trips anywhere in the US, Canada, Mexico, and the Caribbean.

Get instant access to more than one million miles of routable roads—plus a database of more than 32,000 airports, hotels, restaurants, campgrounds, and points of interest. Map'n'Go provides all the information you need for any kind of travel.

You simply select your destination and Map'n'Go chooses your best route based on the parameters you specify. Create your own itinerary, then Map'n'Go prints a customized travel plan that includes a detailed road map and precise directions to all of your designated stops. Map'n'Go determines the best route to suit your preferences, such as type of roads to travel, rate of speed, etc., and it also measures distance and calculates driving time.

For additional information on Map'n'Go, circle 13 on the reader service card.

### Family FunPak for OS/2 Warp



The entire family can get "Warped" with a dozen cool software programs in IBM's

**Family FunPak for OS/2 Warp.** The value-packed CD-ROM contains unique "edutainment" software, featuring titles that appeal to every member of the family, including quality games, education, reference, and personal financial management programs.

The Family FunPak includes 10 native OS/2 titles with the added bonus of one DOS and one Windows program that run on OS/2 Warp. The titles are SimCity Classic Limited, MicroLearn Game Pack (Volume 1), TD-Gammon, Havoc for OS/2 Warp, Rapid Assault, Star Emperor, Magic Canvass, American Heritage Dictionary Concise Edition, Child Development Guide, In Charge at Home, OS/2 Poker, and OS/2 Black Jack.

### Games from Stardock Systems



Stardock Systems has announced a new version of its award-winning **Galactic Civilizations** and has taken over the complete packaging and marketing of the

product. This recent winner of *OS/2 Magazine's* Editor's Choice award remains No. 1 on the Internet Top 100 Games, beating out such well known games as DOOM and Dark Forces. New features in Galactic Civilizations include "governors," which will greatly reduce micromanagement (a bane to most strategy games); networking hooks to allow third parties to add internal multiplayer abilities; new technologies; and new things to build.

Stardock's second OS/2 game, **Star Emperor**, uses the same gaming engine that is underneath Galactic Civilizations to bring you a new and powerful space-based strategy game. In Star Emperor, you must unite the galaxy under a single source of wisdom—yours. The entire game simulates the course of a couple of years, with each turn representing a day. Unlike Galactic Civilizations, where you developed your own technologies and created social improvements, Star Emperor allows you to obtain technologies only through trade, diplomacy with neutrals, or conquest.

For more information, circle 6 on the reader service card.

### Creating Objects for VX-REXX



Powersoft's Watcom Products Division has announced

#### Watcom VX-REXX Object

**Development Kit** for OS/2. With the Object Development Kit (ODK), you can easily create native VX-REXX objects and seamlessly incorporate these objects into the Watcom VX-REXX development environment.

Watcom VX-REXX is a visual development environment for creating OS/2 applications with rich graphical user interfaces. It combines a project management facility, a visual designer, and an interactive source level debugger to deliver an easy to use and highly productive visual development environment. The ODK extends the power of VX-REXX by enabling the creation of new objects and enhancing the functionality of existing objects.

Objects are packaged into dynamic link libraries called object libraries, which can then be loaded into the VX-REXX design environment. The resulting objects appear in the VX-REXX tools window and can be

used in the same way as VX-REXX's pre-defined objects. Starting a new object library is as simple as creating a new VX-REXX project. You simply drag a project template to the desktop, answer several questions, and the ODK generates all the necessary header files, SOM class files, and library files needed to build and link the object library to VX-REXX's development environment.

The Object Development Kit's documentation details the VX-REXX architecture, how to build and debug object libraries, common traps and pitfalls to avoid, how to build bound controls, and it includes a complete reference of all the functions. Several working examples with complete source code are also provided.

For more information, circle 14 on the reader service card.

### Internet Security Solution



A powerful Internet network security solution for businesses, government, and academic institutions, **Site Patrol 2.0** from BBN Planet Corp. is a turnkey service combining hardware, software, and services for high levels of Internet security.

Site Patrol 2.0 gives you a fully managed, protective electronic "firewall" between your organization's internal network and the external Internet. The solution includes firewall hardware and software, installation and integration, 24-hour secure monitoring and response, configuration management, security updates, and alerts.

BBN Planet's firewall combines a bastion host, a choke router, and a fully encrypted management and monitoring infrastructure. Customer networks are monitored nationwide, 24 hours a day, seven days a week at BBN's three Network Operation Centers (NOCs) in Cambridge, Mass.; Palo Alto, Calif.; and College Park, Md.

Other Site Patrol 2.0 features include:

- BBN security analysts on call
- Timely response to security incidents
- Mailing list for security alerts and information
- Monthly reports on firewall activity

- Two scheduled configuration changes each week
- Annual customer training

For additional information, circle 15 on the reader service card.

### Retrieve Fax and Voice Mail via the Internet



NetOffice Inc. has announced a new technology that integrates full fax and voice technology with the Internet Worldwide Web (WWW). **FaxWeb** lets you retrieve your fax and voice messages electronically.

FaxWeb makes fax management as simple as reading electronic mail, eliminating the need to keep your computer on 24 hours a day, without having to pay for a dedicated phone line and without sharing a fax machine with co-workers. Completely integrated with the Internet, a FaxWeb account lets you retrieve faxes anytime from home, your office, an airplane, a hotel room, or anywhere you choose to work.

With FaxWeb, you'll receive a phone number, a web page to view faxes, a password for retrieving faxes securely, and a FaxWeb viewer to save and print fax messages. Other FaxWeb features include e-mail and alpha pager notification of fax and voice mail. A FaxWeb demonstration and free shareware fax viewer is available at <http://www.netoffice.com/faxweb/>.

NetOffice has also developed **VoiceWeb**, which lets you store and retrieve voice messages via the WWW. You can save long distance dialing fees to retrieve voice mail messages and play back messages over the Web.

For more information, circle 16 on the reader service card.

### Self-Assessment on the Internet



IBM has enhanced its **U.S. Education and Training Internet home page** to provide a more complete set of information technology (I/T) offerings, including a new self-assessment tool that allows

technical professionals to identify—and address—any skill gaps they may have in nearly 200 I/T skill areas. With this new tool, you can now rate and improve upon your technical proficiency 24 hours a day, seven days a week on the Internet.

The U.S. Education and Training home page is part of the **IBM Global Campus**, an online grouping of worldwide education and training programs, and can be found at <http://www.training.ibm.com/usedu> on the World-Wide Web.

Among the many products and technology topics you can access, free of charge, are platform technologies, including AS/400, RISC System/6000, and S/390; operating systems, including AIX, OS/2, OS/400, and MVS; plus LAN administration, databases, and other critical I/T and business management topics.

By answering a series of "yes and no" questions on a particular product and skill topic, such as DB2 database administration or MVS performance and tuning, you can target problem areas. Based on

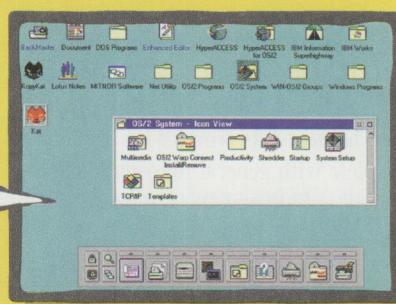
# KopyKat®

REMOTE CONTROL SOFTWARE FOR OS/2



CONTAINS LICENSES FOR TWO PCs!

KopyKat displays the full OS/2 desktop of the remote PC on the screen of your system, under the complete control of your mouse and keyboard!



Remotely controlled PCs are password-protected for attended or unattended access.

## Hilgraeve

High performance software to advance communications  
111 Conant Avenue, Monroe, MI 48161  
Internet home page: <http://www.hilgraeve.com>  
Phone: 313/243-0576, Fax: 313/243-0645

Start exploring KopyKat's many applications today!  
Offer remote support through LAN or modems • Administer LANs remotely and access LAN resources • Monitor employee workstations • Telecommute - work at home.

Order **FREE Test Drive disks** by calling **800-826-2760** (\$7.50 S&H), or download **kkt12.zip** from the Hilgraeve BBS (**313-243-5915**); CompuServe (Go Hilgraeve), or Internet (<ftp://ftp.hilgraeve.com>).

New and improved!  
Transfer files faster, through more modems or SPX/IPX, NetBIOS, TCP/IP or Internet, with even faster remote control.

Circle #32 on reader service card

the answers you give, the self-assessment tool provides a list of courses and publications to assist you in filling the skill gap. From this online list, you can choose to view the course descriptions, pricing, and schedules. Additionally, orders and course enrollment can all be fulfilled online.

The IBM U.S. Education and Training home page also offers a variety of other free services to keep technical professionals current and knowledgeable. These services, which are continuously updated, include:

- **Newsletters**—Published quarterly on six key product areas: AIX, AS/400, Database, Enterprise Systems, Networking, and Personal Systems.
- **Course catalogs**—Course descriptions, prices, and schedules segmented by product and delivery mechanism (classroom or self-study).
- **Training news**—Weekly updates on new courses, conferences, and books.
- **Innovative solutions**—Descriptions of leading-edge training initiatives, which include Object Technology University, certification programs, and customer case studies.

Literature describing the many company training programs and materials offered by IBM, including the *Technical Solutions Catalog*, is also available by calling (800) IBM-TEACH (800-426-8322), extension 111.

### Indelible Blue's New Web Site



**Indelible Blue, Inc.**, an OS/2 software reseller, has formally launched its World-Wide Web site. Complete with general information about Indelible Blue and OS/2 applications, the Web site's home page also offers hot button access to an online catalog, a downloadable version of the catalog,

information about the Indelible Blue sales team, new additions to the Web site (including new product information and links to other Web sites), details on special offers, and a page for those seeking the wisdom of OS/2 guru Einstein.

Indelible Blue handles mail order sales for developers of OS/2 compatible software, including IBM and hundreds of third party software developers.

Visit Indelible Blue's home page at <http://www.indelible-blue.com/ib>. For additional information about Indelible Blue, you can also circle 17 on the reader service card.

### Fast ISA-PCI Backplanes



In response to the persistent demand for faster personal computers, Bustronic

Corporation has released technologically advanced ISA-PCI (industry standard architecture-peripheral component interconnect) backplanes for high-performance personal computers. The new backplanes allow computer designers to easily integrate accelerated CPUs and logic boards for high-speed data transfer and multitasking capabilities.

ISA-PCI backplanes support high-performance computing solutions by combining the standard ISA and PCI adapter/controller cards in the same computer, allowing backward compatibility with the widely used ISA bus and forward computing with rapidly advancing PCI technology.

Bustronic's ISA-PCI backplanes permit data transmission up to the maximum PCI bandwidth of 500 megabytes per second. They feature eight layers of advanced Stripline multi-layer construction, a technology that provides separate ground, power, and signal planes. This results in low cross-talk noise and stable signal trace

impedance, two critical elements in reliable high-speed signal transmission.

To further enhance signal transmission, each slot features high-quality card-edge connectors with gold-plated contacts and filtering capacitors to minimize noise.

For more information, circle 18 on the reader service card.

### Uninterruptible Power Supply



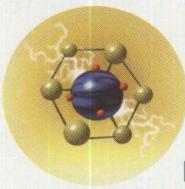
Best Power, a unit of General Signal, is targeting internetworking and communications users with the new rackmount version of its server-sized **Fortress** no-break, line-interactive sine-wave uninterruptible power supply (UPS).

Ideally suited for the high-growth segment of the internetworking industry, the **Rackmount Fortress** is aimed at the rapidly expanding number of users of servers, hubs, routers, and other rack-mounted equipment. These power supplies have an intelligent user interface with a front key pad to easily customize different configurations. They offer full surge, spike, brownout, and "high-line" (potentially damaging overvoltage) protection. And they use line-interactive technology to provide only clean, safe power and to isolate protected equipment from power line problems.

Rackmount Fortress units can be installed in either relay-style or enclosed racks and feature user-replaceable batteries with convenient front access that doesn't require tools. The units are also equipped with a communications port for interactive local and remote power management and automatic shutdown capabilities.

For more information, circle 19 on the reader service card.

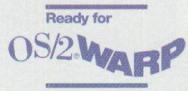
IF YOU  
THINK YOU  
HAVE ENOUGH  
BACKUP FOR  
YOUR OS/2 WARP  
DESKTOP OR SERVER,  
THINK AGAIN.



Desktop to enterprise, Arcada delivers the standard in OS/2 data protection. Sytos Premium for OS/2 servers and Arcada Backup for Warp desktops give you error free restore operations via disk to tape comparison. Point-and-click simplicity and powerful schedulers let you manage backups effortlessly. The widest range of device support protects your current investment in tape hardware as well as covering devices you may add in the future. For more information on the industry's *number one* OS/2 Warp data protection solutions call 1-800-3ARCADA.



for OS/2



Arcada Software, Inc. • 37 Skyline Drive • Lake Mary, FL 32746 • © 1995 Arcada Software, Inc. All copyrights and registered trademarks are property of their respective owners.

Circle #33 on reader service card.



# Tape Backup Products for OS/2

By Bob Angell

**Bob Angell, principal with Applied Information & Management Systems, reviews four products in his search for a small computer system interface (SCSI)-based tape backup solution for his company and his clients. This article documents the features and advantages of each product.**

**O**ne fateful spring day—April 2, 1992, to be exact—we started using OS/2 2.0 for all of our needs—and we didn't look back. In addition, at Applied Information & Management Systems (AIMS), where we cut our teeth on various flavors of UNIX, we began recommending OS/2 to our clients as a viable alternative to a full-blown UNIX installation.

The lack of available, effective tape backup products was a drawback to using OS/2 in the early 2.x days. This did not stop us, however, because we had two things in our favor: 1) we are a complete SCSI-based peripherals shop, and 2) some kind soul ported several UNIX utilities to OS/2 that we could use to back up and restore our data; however, they only worked with SCSI-based peripherals.

Although this arrangement worked for quite some time, we eventually had to

search for a backup product that was a bit more OS/2 friendly.

As a long time contributing author to *Personal Systems* magazine, I thought it might be interesting to document my findings as I installed, used, reviewed, and chose a SCSI-based tape backup solution for AIMS and our clients. Instead of trying to test the software on a variety of equipment and tape drives, I kept all the hardware the same, thus comparing apples to apples. I tested each of the products on the following hardware and software configurations:

- 80486 DX33 (and higher)
- 12 to 32 MB of RAM
- Busmastering Adaptec controllers
- Archive st250/525 external 1/4" tape drives (using the 6150/6250/6525 type tapes)

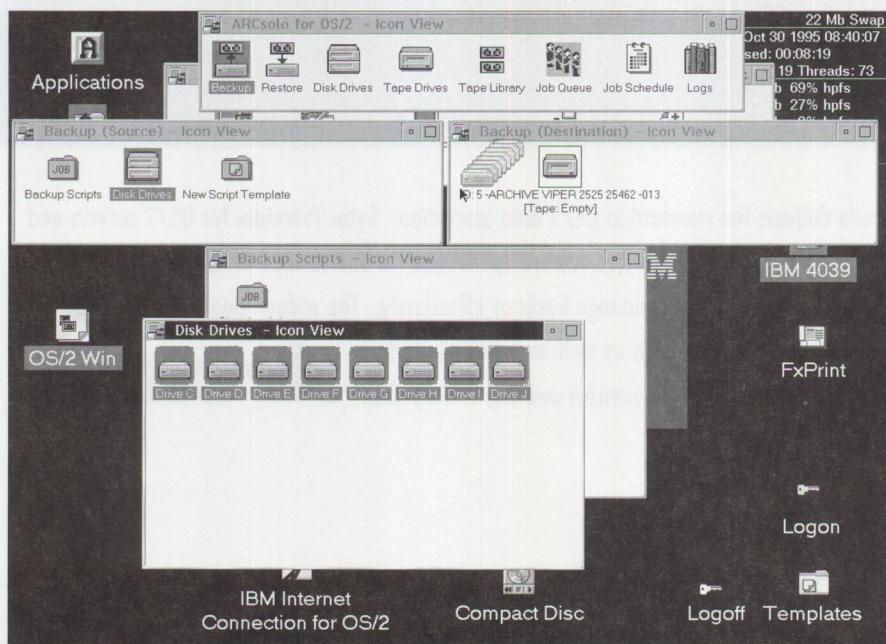


Figure 1. Drag and Drop with ARC solo

- OS/2 Warp 3.0
- LAN Server 4.0 Advanced

I solicited several tape backup vendors for their participation in this review; I received the following software:

- ARC solo for OS/2
- Back Again/2
- SAMS:Protect
- Sytos Premium

If other vendors care to have their software evaluated in a future *Personal Systems* article, I will be glad to test and report under the same conditions.

The purpose of this review is to give you an idea of what is available and what may or may not work in your environment. The intent is not to beat up on the vendors, because those of us using OS/2 are always grateful to have good quality native software.

I tested all the software on High-Performance File System (HPFS) drives *only*, as we do not use File Allocation Table (FAT) drives in any of our installations. All products worked well in this manner, except as otherwise noted.

Now that I've set your expectations, let's look at the products. I will review them in alphabetical order.

## ARC solo for OS/2, Version 1.5

Cheyenne Software  
3 Expressway Plaza  
Roslyn Heights, NY 11577-9894  
Voice (516) 484-5110  
Retail Price: \$295.00

ARC solo for OS/2, Version 1.5 uses OS/2's installation routine, and it works very well. After the installation, an icon with all of the ARC solo goodies placed neatly in a folder appears on your OS/2 desktop. The installation also places a couple of drivers in the CONFIG.SYS file to help the

software identify what backup media you will be using. The software supports jukebox style tape devices (tape devices that select one tape after another like a jukebox selects records) as well as scheduling and backing up multiple jobs. ARCSolo for OS/2 probably uses OS/2's drag-and-drop ability better than any other product I reviewed, as shown in Figure 1, which reflects the drive objects dragged onto the tape object.

The tape backup failed shortly after it began (I think it backed up the first 15 MB). It froze right in its tracks. This occurred not only on a stand-alone box, but on the network server as well. It took me a little while to get through to Cheyenne Software's technical support. They told me that the controller/tape drive combination was not tested and probably would not be supported. This seemed a bit odd, since the controllers are probably the most popular and widely used of *all* SCSI controllers, and the Archive 1/4" tape drives are almost as common as dirt. Nevertheless, I could not review the software any further, which was disappointing because it seemed very promising.

### **Back Again/2 Professional, Version 3.1**

Computer Data Strategies, Incorporated  
Postal Box 25123  
Woodbury, MN 55125  
Voice (612) 730-4156  
Fax (612) 730-4161  
Retail Price: \$149.00

Back Again/2 Professional (BA/2) Version 3.1 uses its own installation routine, as shown in Figure 2, and takes up about 1 MB of disk space when installed. At installation, you can select support for SCSI devices as well as IDE and ATAPI support. The LIBPATH, SET PATH, and SET HELP statements, as well as the appropriate device driver(s), are all updated in the CONFIG.SYS file.

The nice thing about BA/2 is that it is tape drive-independent. This allows you to use larger tape cartridges than what the drive supports and still have the drive use *all* of the cartridge tape. For example, I used a DC6525 cartridge in an Archive st250 (525 MB tape in a 250 MB drive), and this software allowed me to compress the medium in such a way that I got

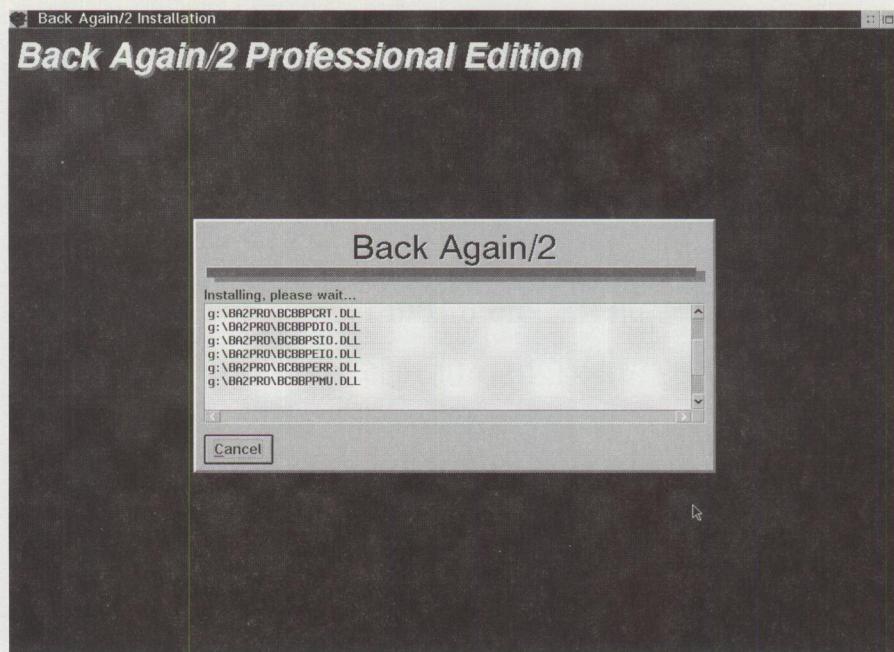


Figure 2. Back Again/2's Installation Screen

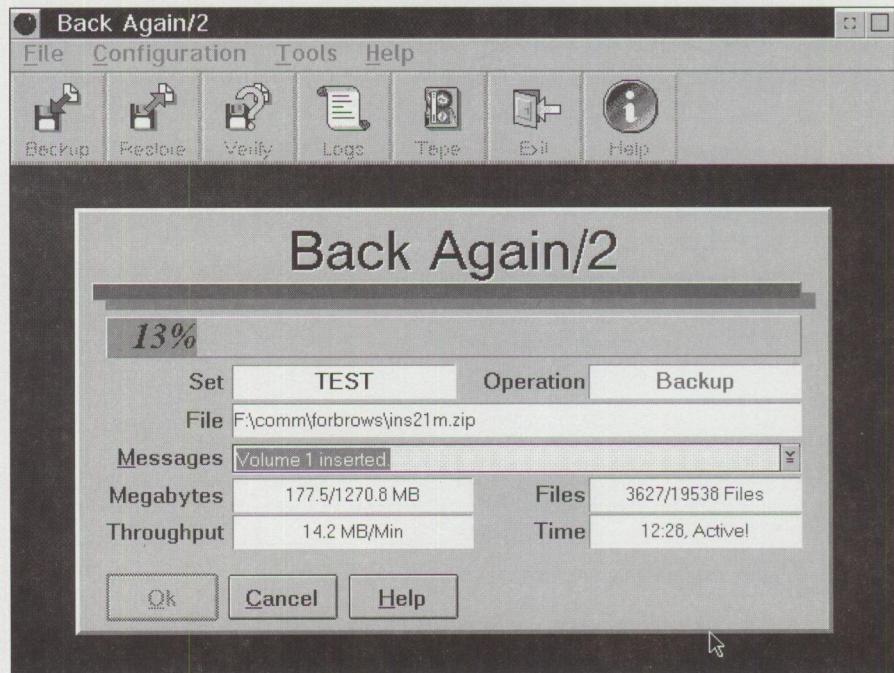


Figure 3. Back Again/2's Throughput Screen

almost 1 GB of data stored on one tape. Other driver schemes do not allow this.

This version has some fine new features, as follows:

- Workplace Shell objects used for backup devices (provides better drag-and-drop capabilities for backup schemes)
- Adjustable high speed buffering (128 K to 2.5 MB, user selectable)

- Improved file selection capabilities
- Automatic data verification
- New dynamic compression option (This allows compression to be turned on or off to prevent the excessive reading and writing over a small area of tape [shoeshining] common on SCSI tapes, thereby decreasing wear on tapes and drives.)

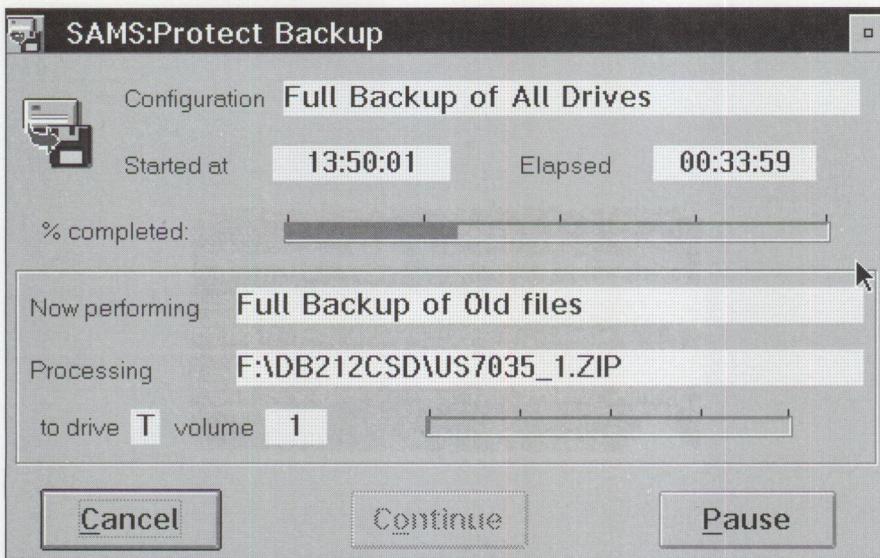


Figure 4. SAMS Backup Scheme

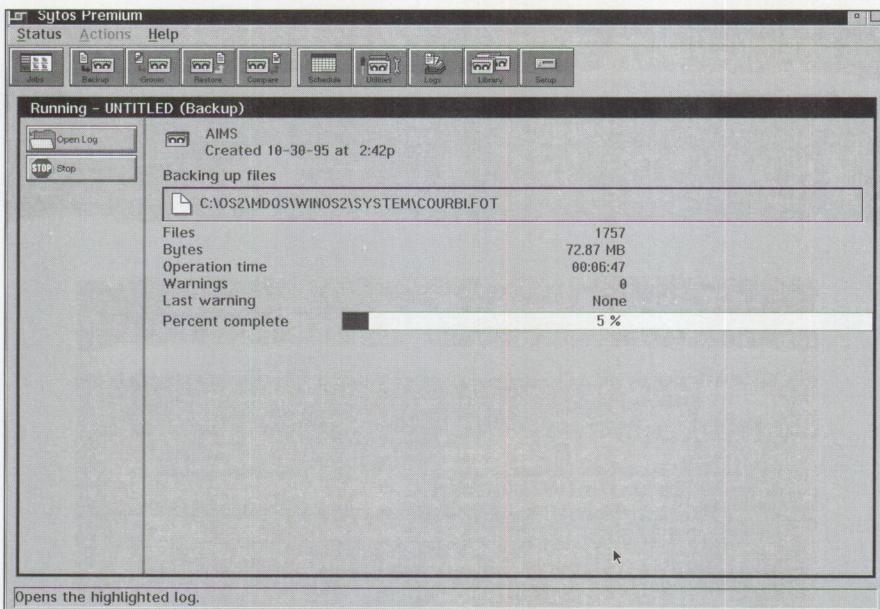


Figure 5. Sytos Premium/Rebound's Interface

- UNC file naming support for networks (UNC is a new standard allowing you to alias your LAN drives. You could, for example, name a LAN drive BOB:.)
- Improved multithreading
- Improved restore options and directions

BA/2 provides many customization options for each SCSI tape, including compression (default, none, HP DCLZ, IBM IDRC, or other compression built into the tape hardware), tape block size (default, variable, 512, 1024, 2048, 4096,

8192, and 16384), and QFA support (default, none, SCSI I, or SCSI II).

You can schedule tape backups daily at a specific hour or minute or at timed intervals. You can optimize the software to increase the compression speed and/or ratio, or you can disable compression. You can even password protect BA/2.

Throughput on the described configuration was about 14 MB per minute on the many full backups I made (Figure 3).

Once a backup occurs, OS/2 generates a catalog showing what files were successfully

backed up. This is crucial because you'll use this catalog when restoring backed-up files.

Back Again/2 worked well overall as I tested and used it on our LAN—there were no glaring problems.

### SAMS:Protect, an Intelligent OS/2 Data Protection Utility

Sterling Software, Incorporated  
Storage Management Division  
11050 White Rock Road  
Suite 100  
Rancho Cordova, CA 95670-6095  
Voice (916) 635-5535  
Retail Price: \$199.00

At the time of installation, SAMS:Protect (SAMS) places the appropriate names in the LIBPATH and PATH statements and the various drivers it needs in the CONFIG.SYS file. This was standard for all of the products I reviewed.

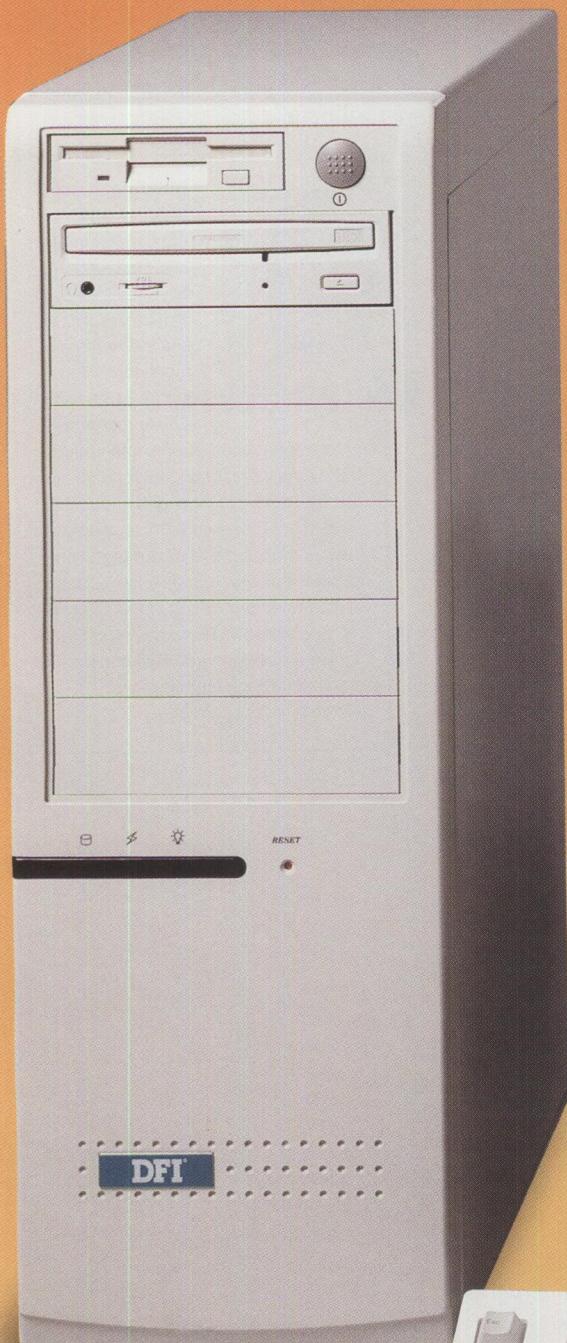
SAMS is a recent addition to the tape backup software scene. As shown in Figure 4, the backup scheme is a bit different. You assign a drive letter to a device, then the backup is sent to that drive letter.

In this case, the backup is going to drive T:. SAMS supports three levels of backups—full, incremental, and consolidated—to help reduce the amount of necessary backup space. These backup strategies work with other packages, but they work best with SAMS.

An interesting feature of this package allows you to split backups between different devices, thereby letting you place aged files on one repository and newer files on another. SAMS will also let you have up to 1,000 different configurations when setting up your backups. This is useful for LANs and large scale operations.

When compared to the compression schemes of BA/2 and the Sytron product, SAMS did not fare well; it provided barely a 2:1 compression ratio (BA/2 had close to a 3:1). Such a difference in compression ratios becomes important when you have to back up large amounts of data with somewhat limited tape resources. As with the BA/2 product, it appears that the "shoeshining" is kept to a minimum.

# Blazing OS/2 Performance



Looking for blazing performance? DFI's Doubleshot™ 150 is fast . . . really fast. Two 150MHz Pentium® processors and preloaded OS/2 SMP pump this fast iron. One of the few systems that can run two of the most powerful CPUs in the world, the Doubleshot 150 smokes.



**Doubleshot  
Dual Processor**

## Doubleshot 150

Two 150MHz Pentium chips  
VLSI Wildcat chipset - fastest available

512KB pipeline burst cache

1.6GB hard drive

32MB 60ns EDO RAM

Six speed CD-ROM

4MB PCI video card

3.5" floppy drive

PCI/ISA slots

101 keyboard

PS/2 mouse

Tower case - 10 drive bays

OS/2 SMP 2.11 Workstation preloaded

*next upgrade free when available*

1 Year On-Site Warranty



for OS/2



pentium

Call 800-808-4334 and ask for a free Doubleshot glass

DFI-USA (916) 568-1234  
info@dfiusa.com

DFI-NE (908) 390-2815

DFI-SE (305) 477-1988  
info@dfise.com

Call (800) 808-4334 Website - <http://www.dfiusa.com>

Doubleshot is a trademark and DFI is a registered trademark of Diamond Flower Inc. Pentium is a registered trademark of Intel Corporation. OS/2 is a registered trademark and the Ready for OS/2 mark is a trademark of International Business Machines Corp. © 1995 Diamond Flower Inc.



Circle #34 on reader service card.

## Sytos Premium/Rebound

Arcada Software  
134 Flanders Road  
Westboro, MA 01581  
Voice (508) 898-0100  
Fax (508) 898-2677  
Retail Price: \$299.00

Sy whole Premium/Rebound (Sy whole) installed smoothly. The one drawback was that you must select a device-specific SCSI card and tape drive. Sy whole's use of these device specific drivers is a double-edged sword. While device-specific drivers let you fine-tune and optimize the software's functionality to the hardware, they can also limit what you can do. In my test case, for example, when I used the 525 MB drive, compression was not even an option. This is a waste of resources and time.

Because the drivers want to take over the majority of the computing cycles, the multitasking is choppy and marginal; however, it is improved over Sy whole's previous versions. The interface (Figure 5) is identical to previous versions.

Sy whole works well on a LAN; however, to get good backup performance, the traffic on the LAN must be almost nonexistent.

When supported, compression works marginally at a ratio of only 1.8:1 or 2:1.

Sy whole Premium includes the Sy whole Rebound product, which helps facilitate

the recovery process when you need to reboot and recover corrupted files.

After my testing, I concluded that Sy whole needs some work to help smooth out the drivers, making them more compatible with other software, to enable the end-user to use compression (thereby freeing up more resources) for all devices and provide a more flexible end-user environment.

### Summary

All products, with the exception of ARCsolo for OS/2, worked very well. All products installed easily and updated the CONFIG.SYS file. Each product created and provided a desktop icon after the installation.

All products supported a command-line interface, letting you set up a REXX script to handle most integrated environments.

BA/2 and SAMS had the best backup scheduling of all the products. BA/2 had the best compression, achieving almost a 3:1 compression ratio. SAMS did well with the different backup options (full, incremental, and consolidation).

None of the products handled open files very well. The ability to create a set of backup diskettes worked the best with Sy whole.

I've ranked these products by price, performance, and overall effectiveness as follows:

1. Back Again/2
2. SAMS:Protect
3. Sy whole Premium/Rebound
4. ARCsolo for OS/2

*Note:* If you have a LAN with more than 500 nodes, you may want to look at other tape backup software strategies, such as IBM's RISC-based ASDM for the AIX/6000 server, because none of the software I reviewed will provide the performance you will want.



**Bob Angell** is a principal with Applied Information and Management Systems (AIMS) in Salt Lake City, Utah. A management consulting firm, AIMS specializes in manage-

ment information systems integration, OS/2 development and integration, total quality improvement engineering, and other related services. Bob's specialties include multiplatform data integration, database design and development, simulation and modeling of complex environments (neural networks), and OS/2 software development. Bob can be reached through the Internet at bangell@cs.utah.edu.

# Fault Tolerance for LAN Server

By Randall Johnson

**Randall Johnson, OS/2 product manager for Vinca Corporation, discusses the importance of data security and availability in corporations today. The author shows how a small investment in a fault-tolerant system can significantly reduce lost productivity due to server downtime.**

For years, the computer industry has appreciated the importance of the billions of magnetic bits precariously stored on their departments' disk drives. Today, however, companies not directly involved in the computer industry are discovering their dependency upon software systems to manage databases and applications such as inventory, payroll, accounting, word processing, order entry, and contract management.

The day-to-day operational data is increasingly regarded as a significant corporate asset. Because the cost of storage media has plummeted to the point where hard-disk drives now cost fewer cents per megabyte than floppy disks, it is safe to say that the content is much more valuable than the container. The time cannot be far off when a corporation's stored data will be valued, insured, and given its own ledger entry on the company's balance sheet.

The past decade could be called the decade of the local area network (LAN). Distributing processing power to the corporate desktop has been a tremendous boon to productivity, but the focus on distributed computing has overshadowed the equally important issue of protecting corporate data assets. Many companies who moved strongly into LAN computing are living with a kind of information anarchy and are searching for ways to get control of their data. The call to arms in the decade of the LAN was "the network is the computer," but it is time to remember the purpose behind it all—that *the data is the reason!*

## Are You Being Served?

As the dependence upon stored data increases, so does apprehension about the

reliability of the systems that store, manage, and retrieve it. When data becomes unavailable, companies lose money.

Consider these statistics from a survey of Fortune 1000 companies conducted by Stratus Computer Inc.:

- The typical system outage lasts for an average of four hours and costs an average of \$329,000 in lost revenue and worker productivity.
- Computer downtime cost U.S. businesses more than \$3.8 billion in lost revenue and worker productivity in 1992 (the last year for which such research data was available).
- The average hourly revenue loss from downtime is \$78,000.
- Major businesses lost approximately 38 million worker hours annually, or \$444 million in wages, due to downtime.

Networked storage systems serve tens, hundreds, and even thousands of connected clients. A file server failure idles thousands of workers, resulting in the revenue losses illustrated by the 1992 statistics. Maintaining data availability is clearly an information system (IS) priority. The future will bring even greater data re-centralization as corporations plug into data warehouses—large repositories of information that can be mined for important relationships and indicators.

The IS manager must consider three distinct types of solutions to mitigate the effects of failures in networked storage systems: fault tolerance, back-up, and disaster recovery. Of the three, fault tolerance is the first line of defense against system failures. Adding redundancy allows a fault tolerant system to gracefully handle a failure in any

component for which a spare is provided. Sophisticated systems allow the spare to be used to balance the load until a failure occurs. At that time, the remaining component picks up the full load with a concomitant decrease in performance but little or no interruption in service.

Most file servers allow for multiple network interface cards (NICs) to provide multiple, redundant paths between server and clients. Disk mirroring keeps a copy of important data on a second disk drive. In the event of a drive failure, the file system continues to provide access to the data using the remaining healthy drive.

Duplexing extends the mirroring idea to host adapter cards. In this case, the mirrored data is kept on a drive connected to the server through a second host adapter. This guards against failures in the host adapters as well as the drives. A more sophisticated form of mirroring—RAID level 5—uses a less wasteful method for providing data redundancy but is not as well suited for duplexing.

None of these techniques provide an effective preventive measure for problems with the server platform itself. In addition to memory parity, power supply, and other hardware related faults, servers are also susceptible to a wide range of software related errors. Server redundancy is accomplished by adding a second server with access to the network and an up-to-date copy of the data, ready to step in when needed. Even though complete server system redundancy is still a relatively new science, an IS manager can provide effective server fault tolerance today, from both a cost and a performance perspective.

## Stand By Your LAN

StandbyServer 32 for LAN Server from Vinca Corporation provides a fault tolerant solution for IBM LAN Server installations. To do this, a second, standby machine is set up and connected to the primary server with a dedicated,

# StandbyServer 32 for LAN Server

StandbyServer 32 for LAN Server is the premier fault tolerant mirroring system for networks running IBM's OS/2 LAN Server Advanced. It gives you the ability to connect a hot, online replacement server to the main server that can take over instantly if the main server fails. In virtually all configurations, users experience no downtime; they don't even have to log in again. Data is automatically mirrored between the machines, through native LAN Server mirroring via a high-speed dedicated link.

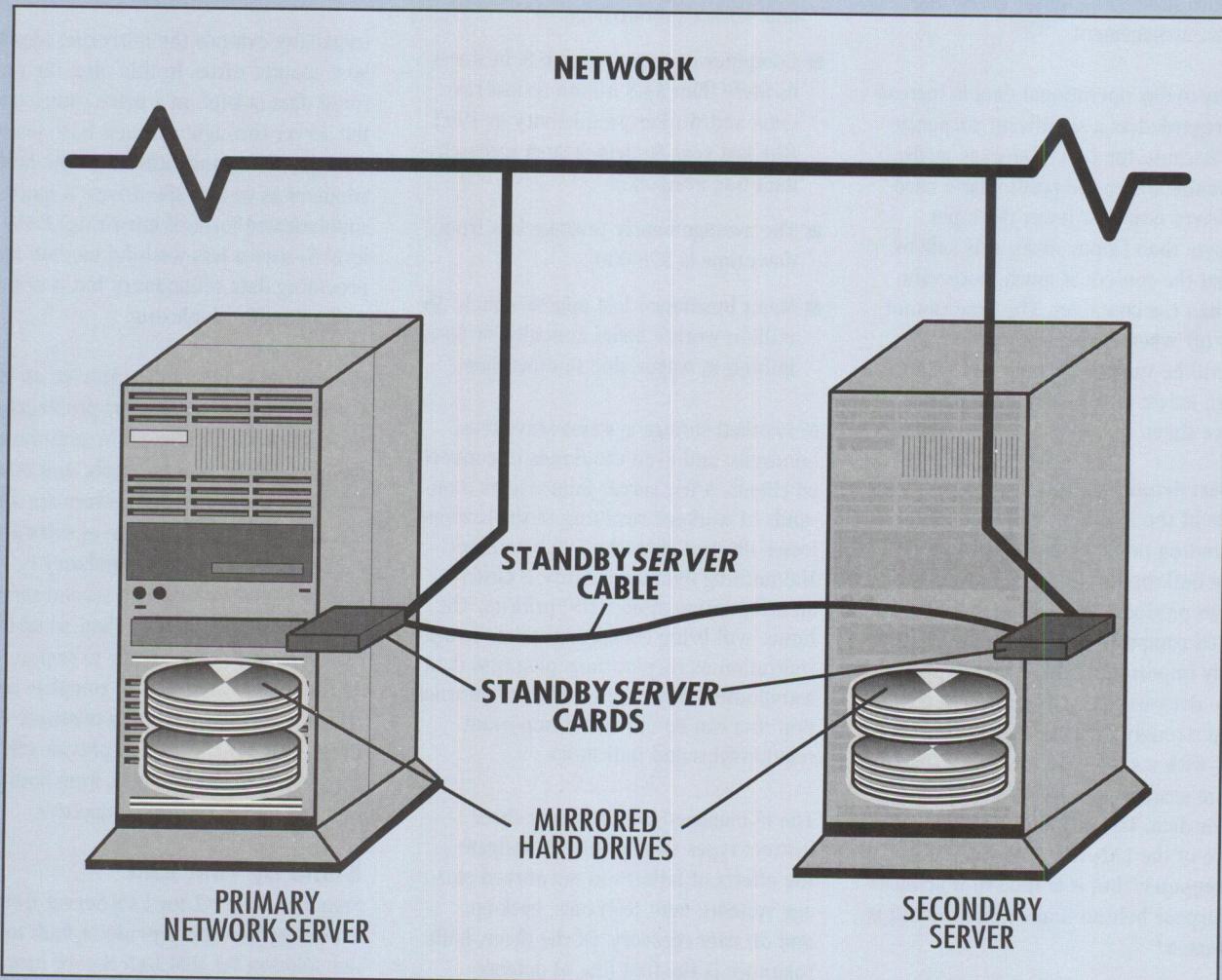
StandbyServer 32 for LAN Server was developed specifically for mission-critical networks where the cost of

downtime is significant. It ensures data availability in the case of software or hardware failure while preserving diagnostic information on failures in the primary server. StandbyServer 32 for LAN Server provides a level of fault tolerance previously unavailable for LAN Server networks.

## Benefits

- All data is fully protected and made available through a redundant file server.
- Switching to the standby machine is automatic with only a momentary delay for users.

- Since identical servers are not required, companies can extend the life of older equipment.
- With mirroring information being passed over high-speed Vinca components, the system adds no traffic to the network.
- It is compatible with OS/2 2.x and OS/2 Warp, and with Warp Server, LAN Server 3.0, and LAN Server 4.0 Advanced.
- It uses only a single LAN Server Advanced license.
- Its customizable remote notification features are compatible with Netfinity (included).



StandbyServer 32 for LAN Server gives complete fault tolerance and data protection in the event of a server failure.

high-speed link. An up-to-date copy of important data is kept on the disk drives in the standby machine using LAN Server's native disk mirroring (duplexing). In the event of a failure in the primary server, the standby machine automatically steps in to run LAN Server and provide access to the networked data.

*StandbyServer 32* for LAN Server operates at the block level, below the file system, ensuring that the data on both servers is exactly duplicated on an I/O-request-by-I/O-request basis. Systems that rely on file copying or replication suffer from long latencies and do not handle open files.

The persistent connection capability of LAN Server's client requester makes switching between servers painless for users. The impact of a failure in the primary server will vary from application to application, but with a switch-over time of just more than one minute, work interruption is minimal, if noticed at all.

*StandbyServer 32* for LAN Server uses Netfinity (an IBM network management tool set) to generate system alerts that can be used to notify the system administrators of selected events, by pop-up menu, pager, or even audio .WAV files. The switch-over and notification system is completely open and easily customized to fit any particular site installation.

While the standby machine does not provide load balancing in connection with the primary, it can be used for other,

independent tasks. The standby machine can be configured to stand in for a domain controller, back-up domain controller, or simply an additional server. The standby server platform need not be the same type of machine as the primary, offering a real solution of what to do with the old server after upgrading to a more powerful model.

### **Warp Server and StandbyServer 32 for LAN Server**

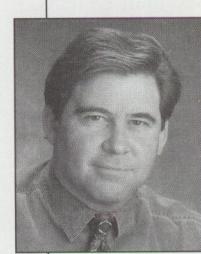
IBM has recently taken an encouraging step in the promotion of its highly capable file server system. In creating OS/2 Warp Server, IBM has combined the three elements essential to building a highly effective and manageable networked server: OS/2 Warp, LAN Server 4.0 Advanced, and SystemView.

OS/2 Warp is an excellent foundation on which to build a server system. LAN Server 4.0 Advanced is a state-of-the-art file server program with a simple to use administrative front end and support for disk mirroring and duplexing. SystemView is a Netfinity-compatible derivative that manages networked components. By combining OS/2 Warp, LAN Server 4.0 Advanced, and SystemView into one package, IBM has created a potent competitor to NT Server and NetWare. All that is needed to build a complete server fault tolerant solution is the addition of *StandbyServer 32* for LAN Server from Vinca.

### **Fault Tolerance First**

By some estimates, data requirements are increasing at a compound rate of 40 percent per year, resulting in increased pressure on the IS manager to maintain data online and keep it uncorrupted. Down time costs are significant in terms of both lost revenue and goodwill.

Disk mirroring, duplexing, and RAID level 5 are effective disk channel fault tolerance mechanisms, but they leave the file server platform unprotected. Vinca's *StandbyServer 32* for LAN Server has extended duplexing to include the server platform, providing complete fault tolerance for the network file server system. Considering that the entire cost of implementing the standby solution could be recouped in a single hour of recaptured down time, IS managers should take a closer look at server fault tolerance *before* rather than *after* the next downtime event.



**Randall Johnson** is the OS/2 product manager for Vinca Corporation, inventor and leader of storage access networking. Johnson previously worked on parallel distributed processing pro-

jects for Martin Marietta. He has a Master's degree in Electrical Engineering from Brigham Young University.

# Getting Together with cc:Mail

By James King

**With nearly seven million mailboxes worldwide, cc:Mail is the world's most popular LAN-based electronic mail package. This article discusses the reasons behind this success, details cc:Mail's unique architecture, and includes a brief history of the product's evolution.**

**D**ating back to 1985 when cc:Mail Remote for DOS first shipped, this electronic mail system has provided companies with a state-of-the-art way to communicate. This success can be linked to five key factors:

- cc:Mail works with almost everything (workstations on different platforms and their various network topologies, network operating systems, network file servers, wide area networking technologies, host-based mail systems, public subscription mail systems).
- cc:Mail scales to any size organization.
- cc:Mail's user software is feature-rich and easy to use.
- cc:Mail has outstanding management tools and features.
- cc:Mail is cost effective.

These strengths are attributed to cc:Mail's unique architecture, including its distributed processing, open systems approach, and modular design.

## Distributed Processing

cc:Mail is designed to take maximum advantage of the local area network environment where users at intelligent workstations can share information storage. The architecture employs a central database and takes advantage of the intelligence at the node. This unique approach provides the advantages of a central database on a mainframe computer, where single copies of messages are stored with multiple pointers showing who has access to the messages. Unlike a mainframe environment, however, cc:Mail's architecture frees the file server of any foreign processing tasks (preventing it from becoming overloaded with electronic mail functions) by distributing

those processing tasks to the workstations. The intelligent workstations offer users a consistent and friendly interface,

thereby maximizing the intelligent workstations' power and flexibility.

The file server's central database, referred to as the cc:Mail post office, has a multi-user, multithreaded design that accommodates large numbers of simultaneous database accesses. As a result, workstation

## cc:Mail History

From 1970 to 1983, Dr. Hubert Lipinski, a physics Ph.D., created prototypes for electronic mail and conferencing systems at the Institute For The Future (IFTF). The Department of Defense Advanced Research Projects Agency (DARPA) commissioned IFTF to develop "Forum," a teleconferencing system that could run on DEC TOPS 10 mainframe computers. Lipinski enhanced Forum's real-time conferencing capability and ported it to Tymshare, which sold it commercially as "Plant." The National Science Foundation then commissioned Lipinski in 1977 to develop the HUB system, which was the first electronic communication system to run applications, edit documents, and support graphics.

In 1983, Lipinski and two partners formed a company called Concentric Systems to develop commercial e-mail systems. The company changed names several times: Comcraft, PCC Systems, Inc., and, finally, cc:Mail. The company's first electronic mail product, cc:Mail Remote for DOS, shipped in 1985. In 1986, Lipinski modified a product called cc:Mail Remote so that it could run on a LAN; it shipped that year as cc:Mail DOS LAN.

Fueled by excellent press reviews, cc:Mail began selling electronic mail to large companies, offering wide area

network features. The General Service Administration commissioned cc:Mail to link the post office in their San Francisco office to the post office in their Washington D.C. office. The result was the release of cc:Mail Gateway (subsequently renamed cc:Mail Router).

By 1988, the market for electronic mail had grown significantly as LANs became more mainstream technology. cc:Mail for OS/2 shipped that year. *Software Digest* did the first competitive analysis of LAN mail products and granted cc:Mail its "Highest Overall Rating" award, an accomplishment that cc:Mail repeated in 1992, with subsequent awards from *PC Magazine*, *PC World*, *Infoworld*, and *LAN Times*.

In 1989, Phillippe Courtot, then president of cc:Mail, realized that cc:Mail required the backing of a large company in order to compete as a strategic e-mail vendor in the global market. The acquisition of cc:Mail by Lotus in 1991 enabled cc:Mail to accelerate the development of new products and to market those products effectively in both domestic and overseas markets.

Since 1991, the number of users has grown from one million to eight million. Lotus cc:Mail is now shipping in 16 different languages.

processes can perform read, write, and delete functions simultaneously within the database. This capability is due in part to cc:Mail's advanced file and record locking method, which reserves space within the database for future activity, rather than locking the database during full read and write operations in a more conventional approach.

Allowing multiple processes to take place on the database at the same time achieves a very high traffic handling level. A single cc:Mail post office on a file server can handle hundreds of users, surpassing the current user capacity of most network operating systems. As network operating systems become more and more powerful, cc:Mail installations will be ready to handle additional workload.

## Open Systems

cc:Mail's architecture is based upon an open systems approach that incorporates the following:

- Industry standard file-locking protocols
- Binary database
- Non-processing file server
- File structure independence

Taken together, these design characteristics give the system a high degree of transparency and portability, as well as a flexible user interface. cc:Mail's architecture is also network-vendor neutral. Many organizations use it to unite a disparate collection of LANs. For example, cc:Mail can easily unite a NetWare network in New York and a LAN Manager network in London into a single cohesive mail system.

The database for a cc:Mail post office comprises three types of binary files. The first type is a single file that contains all messages for the post office, including both transient and stored messages. Messages in this file are stored in a random access method, tailored to provide optimum performance for user-to-user communications.

The second type of database file, again a single file, contains all directory information for the post office. This centralized directory storage allows the inclusion

of tens of thousands of names and is designed to allow the addition of enterprise-wide directory maintenance, as well as future adoption to CCITT X.500 directory services.

The final type, user mailbox files, contains pointers to the directory and message files, indicating those messages to which each user has access. Thus, as messages are sent by one user to several others, a single copy is stored in the message file, then pointers are placed in the user mailbox files to indicate access.

Because the cc:Mail database is a set of binary files existing on any computer system, it is not dependent upon the file structure of the resident operating system. This provides two distinct advantages. It means you can easily install the database structure in a wide variety of server environments without requiring a "port." It also means the database is not affected by the operating system's file-handling limitations.

## Modular Design

cc:Mail's underlying modular design is implemented in a "plug and play" fashion. This design accommodates evolutionary growth to add new users and post offices. Within a single post office, you'll use a new directory entry to add a new user mailbox. Once this has been done, the new user has complete access to all cc:Mail capabilities.

Similarly, a single directory entry is all that is required to integrate a new post office into an entire electronic mail network. By simply adding the directory entry for the new post office and the desired routing and addressing information, that post office becomes fully integrated into the electronic mail network. This feature is crucial as organizations change and grow.

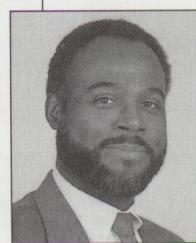
cc:Mail's open message architecture allows it to incorporate a variety of media forms and to easily add new media forms. It is the first LAN-based electronic mail system to use a "compound document" structure for its messages. This message structure can best be compared to an envelope where the message can hold a variety of components, not just simple text with file

attachments. Facsimile has already been added, and cc:Mail's design allows for voice capability, video, and other new media as they become available on intelligent workstations.

Not only is the compound document structure unique, but within that structure, cc:Mail employs an overlay process for its message components so that several different media can work together. The cc:Mail text highlighter, an integral part of the built-in text editor, uses this overlay capability. If a user decides to highlight text in a message, it is actually overlaid on the text and stored separately in the database so that it can be changed or removed later. While the highlighting appears (to the user) to be imbedded in the message, it is actually a separate component. In the future, it will be possible to mix a variety of media in a single message component to give a more meaningful presentation.

Even within the workstation software, cc:Mail is migrating to modularity. The cc:Mail user software for Windows was the first product based on cc:Mail's new Mail Engine. The Mail Engine is designed to be quickly ported from one client operating system to another. It is used by all cc:Mail clients with the code that is specific to a particular desktop operating system in a separate module. The Mail Engine and other new cc:Mail products are also written in the object-oriented C++ language.

cc:Mail is cost effective for an organization of any size. It allows an organization with a heterogeneous installed base to provide consistent, easy-to-use, high-end electronic mail features for its user base. cc:Mail is state-of-the-art electronic mail. It continues to grow and evolve as new standards emerge and new features are requested by its enormous customer base.<sup>1</sup>



**James King** is an advisory marketing support representative in IBM's Personal Computer Competency Center in Roanoke, Texas, where he is the team leader for cc:Mail technical

support. He has spent the last 16 years supporting IBM's office products—from MVS host products to cc:Mail LAN.

<sup>1</sup> Parts of this article are excerpts from "cc:Mail Technical Backgrounder," copyright 1995, Lotus Development Corporation, used with permission of Lotus Development Corporation. cc:Mail is a trademark of cc:Mail, Inc., a wholly owned subsidiary of Lotus Development Corporation.

# Personal Systems

## FAST FAX FEEDBACK

Use this form to give us feedback or to change your address. Please provide a copy of your current label. First, make a copy of this form. After completing it, **FAX it to (817) 961-7218**.

- Feedback
- Change of address

| COMMENTS ON THIS ISSUE  | RANKING                  |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | Very Useful<br>1         | 2                        | 3                        | 4                        | Not Useful<br>5          |
| <b>Overall</b>  | <input type="checkbox"/> |
| <b>Focus</b>  |                          |                          |                          |                          |                          |
| What's New?   | <input type="checkbox"/> |
| Tape Backup Products for OS/2   | <input type="checkbox"/> |
| Fault Tolerance for LAN Server  | <input type="checkbox"/> |
| Getting Together with cc:Mail   | <input type="checkbox"/> |
| Sales Force Automation: Building the Intelligence-Driven Sales Organization | <input type="checkbox"/> |
| The New Mercantilism  | <input type="checkbox"/> |
| <b>Technical</b>  |                          |                          |                          |                          |                          |
| Designing Lotus Notes Applications That Perform                             | <input type="checkbox"/> |
| Designing a Scalable Lotus Notes Workflow Application                       | <input type="checkbox"/> |
| Lotus Notes for AIX in a Personal Systems Environment                       | <input type="checkbox"/> |
| New Administrative Features and Enhancements in Lotus Notes Release 4       | <input type="checkbox"/> |
| MQSeries link for Lotus Notes   | <input type="checkbox"/> |
| Getting Warped and Connected Too! – Part Two                                | <input type="checkbox"/> |
| <b>Little Solutions</b>   |                          |                          |                          |                          |                          |
| Questions and Answers   | <input type="checkbox"/> |
| Corrective Service Information  | <input type="checkbox"/> |
| Suggestions for future articles:  | <hr/> <hr/> <hr/>        |                          |                          |                          |                          |

How can we improve this publication? \_\_\_\_\_

To change your address, provide the following information (please print):

Mr. / Mrs. / Ms.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_ Business Telephone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

First, make a copy of this form. After completing it, **FAX it to (817) 961-7218** or 961-6520, or mail to:

Personal Systems  
IBM Corporation  
Mail Stop 40-B3-04  
One East Kirkwood Blvd.  
Roanoke, TX 76299-0015

# Sales Force Automation: Building the Intelligence-Driven Sales Organization

By Mei Y. Mo

***Mei Mo, director of consulting at IntellAgent Control Corp., describes the implementation of the IntellAgent Control System in Sanwa Business Credit Corp.'s Vendor Financing Division. This article shows how Sanwa's sales force became more productive and thus more effective through the power of customer relationship management.***

**K**nowledge is power. Nowhere is that more true than in a commercial credit operation. Competition is fierce, sales cycles are long and complex, and world-class customer service is essential to maintaining flourishing long-term relationships.

Sanwa Business Credit Corp. is a Chicago-based multi-billion dollar subsidiary of Sanwa Bank Ltd., Tokyo, one of Japan's largest banks. This article focuses on the firm's Vendor Financing Division, which acquires and maintains wholesale lending relationships, providing financing services to companies that want to offer lease or purchase financing to their own customers.

The challenge of acquiring and maintaining these accounts involves intensive coordination of relationships and commitments between team players within Sanwa and multiple players inside their client companies. The financing structures are often unique to the clients and require considerable research and negotiation. The sales cycle typically runs from six months to a year, but, once gained, these relationships are often long-lasting.

The subsidiary's CEO, William Moeller, is known as a visionary who sees technology investments as a means to gain competitive advantage. To further Moeller's vision, he fosters the use of advanced measuring techniques to manage progress and processes at Sanwa Business Credit Corp. Moeller recently spearheaded a significant new development in the division's information architecture to better manage and measure key business activities—including sales and continuing relationship management of client accounts.

The change involved implementing a sophisticated account- and project-management solution over a groupware platform and had significant impact on the operations of the sales organization, the first group to use the new solutions. The decision to implement this new architecture was stimulated by a need for better information movement throughout the organization.

## The Old Way

Previously, Sanwa's account managers used a best-selling personal information software program to manage their contact information and activity scheduling. While this was a satisfactory solution for the individuals, the program did not readily provide for sharing of information both laterally and vertically through the organization.

The situation is described by Jon-Paul Cowen, vice president and Western region manager, in this way: "We were managing huge amounts of data, but we were not making optimal use of it." He said the company's product information, account histories, and competitive databases were scattered in information islands, some of which had been generated internally and some of which had been imported. Even though the sales people grew fond of their personal information manager, he needed to consolidate information to track sales at the regional level.

While inability to move information up the organization was a problem for executives, account managers faced their own problems with the old system. There was no sure way to know if client prospects

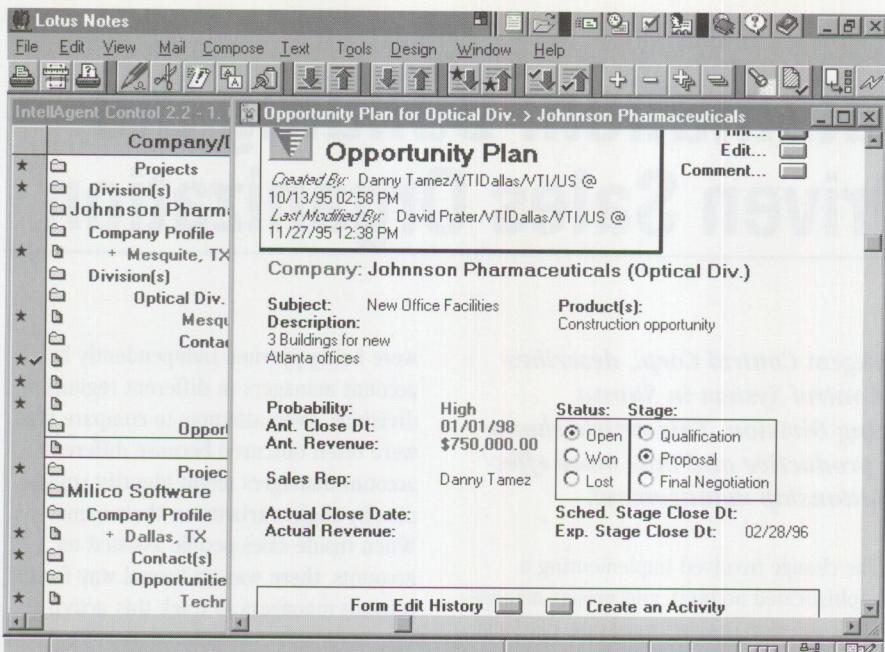
were being pursued independently by account managers in different regions or divisions. Even attempts to compare files were often obscured because different account managers might identify companies by slight variants on their names. When inside sales people assisted on accounts, there was no formal way for the account managers to track this activity.

## The New Way

The solution Sanwa found was the IntellAgent Control System, a database designed for enterprise-wide relationship management. In deciding on IntellAgent Control, Sanwa also committed to Lotus Notes, the most widely used groupware platform, on which IntellAgent Control runs. The Notes platform provides selective database replication—that is, the ability to update the central database from users' input and refresh users' copies of selected portions of the database at their request. IntellAgent Control running on Notes added specific features for managing accounts and activities in a group environment, as well as tracking and forecasting opportunities for new business.

The technical management of the conversion was placed with the Information Systems (IS) group, led by Larry Windelman, chief information officer. Executives and key managers were formed into divisional teams to outline specific screen design and data requirements. The IntellAgent Control System permits this customization on a division level without affecting the underlying structure of the enterprise-wide data model. (See the sample IntellAgent Control screen in Figure 1.)

The new groupware architecture involved upgrading end-user computer resources to manage the large databases replicated into their personal computers. The first users received desktop or laptop 486 33 MHz PCs with 220 MB of disk space. Many



**Figure 1. Sample IntellAgent Control Screen**

have since upgraded to faster processors of up to 100 MHz with 500 MB to 1.2 GB of disk space to more efficiently handle the databases. The offices run on Token-Ring LANs and are wide area networked on leased lines to two Pentium-class servers, where the Notes databases reside. The client/server systems run on the OS/2 operating system.

## The Implementation

The implementation of IntellAgent Control began in March of 1994 in the Vendor Financing Division. There, Cowen expected the system to provide support in managing the division's many vendor relationships and in acquiring new vendor clients.

With such lengthy sales cycles, the cost of acquiring new accounts is considerable. One of Cowen's first goals of implementing the new system was to use the information it provided to apply resources more effectively. In part, this was simply a matter of consolidating the account information from all sources within his division, so that all team members and management could better understand the client's business. This understanding is key to structuring the financing agreements to match the way that clients are already running their businesses.

This broad-based access to information assisted not only in the selling, but also

in the closing process. "It helps us to negotiate to meet a client's needs," says Cowen. "It's another arrow in our quiver."

In the Vendor Financing Division, each account manager's compensation plan comprises two primary components. The first is new business. The second is volume and growth in existing relationships. Once an account has been won, the credit and administration organization becomes an important part in supporting those accounts. The new system also facilitates inter-departmental communications between the account managers, the credit officer, and the administrator.

For example, a common and sensitive question between account managers and their clients is the status of a particular transaction. Account managers, who are often traveling to visit their accounts, can log on to the Notes server through a toll-free telephone number and either view a transaction update from the credit administration area or forward an inquiry for the most current update. The system allows the sender to prioritize a message as urgent, if necessary. Urgent messages appear on the recipient's computer monitor as an incessantly flashing icon. Sanwa's reputation for customer service is enhanced when account managers can quickly obtain specific information about exactly which

missing documents are delaying the transaction's approval.

For account managers, the path to such casual and effective use of the new information resources involved training as well as a top-down management commitment to the system. The major portion of the technical training was to familiarize the users with the Notes environment. After that, learning the IntellAgent Control System was an intuitive process.

The training was supported by a consistent management message about what was expected in this new environment. Everyone had to enter their accounts in a certain manner and record activities. "In the old environment, you were measured by what you knew," notes Cowen. "In this environment, people learned they were measured by what they contributed to the organizational knowledge base and how well they've kept their managers informed."

Despite the learning curve involved with the new groupware environment, many account managers quickly learned the benefits of carrying all their account information on their laptop and being able to communicate with their management and team members. Mark Miller, vice president and account manager, says his new portable working environment allows him to arrive at a hotel and dial directly from his laptop to Chicago on an 800 number. "Even if I've just come back from a vacation, if any action has been taken on one of my accounts, I don't even need a message about it. It's right there in the account database," he said.

The same interconnectivity has also virtually eliminated "phone tag" both within the Sanwa team and with clients who are also using e-mail systems. The e-mail system is used not only for messages and memos, but also to move proposals and formal documents between Sanwa and its clients. These documents can move electronically through the approval process of revisions and legal review on both sides of the deals, before hard copies are finally printed and signed. However, all final documents are embedded in the IntellAgent Control database for immediate access.

## The Benefits

Sanwa's executive management is also achieving ideal results. Cowen uses the

system to prepare and electronically deliver a weekly sales status report for senior management. The process is simpler now, as he spends less time acquiring information and sorting through messages. "Now, on Friday morning, I look, and it's there. After a quick review, it's completed. What used to take hours now takes 15 minutes," Cowen said.

The features tracking an account's status, as well as its potential value to the company, provide for prioritization of activities and allocation of human and budgetary resources. The system identifies the status of accounts in the sales "pipeline" as well as projects their total value to the company.

In addition, by maintaining records of all account activity, the system provides managers with an overview of account managers' effectiveness in terms of both the quantity and quality of client relations. "I know who is 'working the system' and who is developing productive relationships," Cowen said.

The system allows tracking at whatever level of detail is necessary, even down to a piece of paper that may not be moving fast enough from someone's desk, allowing organizational bottlenecks to be

identified and treated. Resources can be shifted to key areas that need attention.

Potential client problems are also easier to spot. One of the key points tracked is rejections of any transaction or program. If too many of a clients' customers are denied financing, an investigation can begin into the reasons. This allows account managers to deal with potential problems proactively, rather than waiting to react to a client's complaint.

At this point in the implementation process, it is too early to calculate measurable results of the new *IntellAgent Control System* running on Lotus Notes. Nevertheless, the strategic benefits are already becoming obvious.

Cowen has observed the surprise and pleasure of clients who, when visited by Sanwa's senior executives, discovered that these executives knew the details about their accounts. In fact, account information in the database is so complete and concise that after studying it one new account manager became productive in three months, nine months short of the typical learning period.

Miller has found opportunities to cooperate with account managers across the

country in servicing multiple divisions of the same account. He has also used the system to research new financing structures with other account managers who may share similar client demands.

Miller currently estimates that he has recovered 25 percent of his time, time that used to be spent handling paper and preparing reports. But he also believes that both he and the organization have only begun to realize the benefits they gain from increased efficiency.



**Mei Y. Mo** is director of consulting at *IntellAgent Control Corp.*, where she is responsible for helping clients implement organizational sales force automation projects and incorporating

their requirements into the capabilities of the *IntellAgent Control System*. Mo came to the firm from Sanwa Business Credit Corporation in Chicago, where she instituted and managed automation to support internal business units. She was directly involved in the planning, implementation, and internal communications program associated with the adoption of Lotus Notes and the *IntellAgent Control System*.

# The New Mercantilism

By Todd Watson

*Todd Watson presents a cosmic view of the marriage of IBM and Lotus, comparing the relationships of 18th-century merchants with the communications channels of today's Internet.*

**T**he Information Revolution . . . While merely another over-meditated, under-understood aphorism—like “information superhighway” or “new media”—whose originally intended connotation has inevitably become clouded by a thick veil of generalization, it (the “information revolution,” that is) is a term that continues to haunt us as we move toward the dawn of not only a new millennium but, more importantly, toward new ways of doing business.

But does anyone ever stop to think about what an “information revolution” really means? Or better yet, what it could mean?

According to *The New Columbia Encyclopedia*, the word “revolution,” borrowed from astronomy, took on its political meaning in 17th-century England, where, paradoxically, it meant “a return or restoration of a former situation.” Only after the French Revolution did the word define a “new beginning.”

Whether or not we suddenly find ourselves at the emergence of a new beginning, the fact of the matter is that we’re definitely not where we were just recently—altogether trapped in a supervisory-centric, hierarchical cosmos where decisions were made at the corporate zenith and subsequently executed by the common laborer, including yours truly.

The vast corporate downsizing that transpired in the late 1980s and early 1990s, with the resulting “flattened” organizations, engendered not only a

new perspective to view the domain that is business—it also demanded new tools and strategies with which to operate.

shipping lanes and ports rather than bits and bytes streaming over copper and fiber-optic cables. Those pre-digital merchants were no fools—the currency of exchange tended to be gold bullion, not information, the objective being to sell more than was bought.

While the basic precepts of trade may still be with us, the manner by which goods, services, and, most importantly, information changes hands has been drastically altered. Today’s “chartered companies” engage in commerce occurring at tempos once unimaginable to the Dutch/British East India and Massachusetts Bay companies of yesteryear. Orders today are transmitted through an infrastructure that, although seemingly impossible, makes tomorrow’s purchase available yesterday.

And yet how different is it, really? Despite the seemingly antediluvian methods by which mercantilists shifted their goods from one material place to another during those primitive yesteryears of global commerce, the process *still* demanded a web of relationships by which such transactions could occur. No matter how such transactions were carried out—train instead of ship, plane instead of train, car rather than carriage—the port of departure started where the point of a feather quill ended.

As information technology professionals, we’ve made it our life’s toil to cultivate the art of honing that quill by using whatever means are at our disposal. Some call it data processing, others management information systems, yet others simply IT. By putting information at one’s fingertips, we’ve redefined the art of the possible.



In turn, despite the insanely rapid flowering of the Internet, and all of its accompanying (if often overzealous) fanfare, the trickle-down effect of information dissemination has initiated a recipe for change whose ingredients are numerous, as well as unprecedented, in the annals of global commerce. *Or are they?*

The vast mercantilistic empires that dominated global commerce through the end of the 18th-century constituted an Internet of sorts—albeit one made up of complex business relationships that transcended geographical borders via

Unfortunately, the possible is continuously transformed in a competitive environment that changes by the nanosecond. The once static, structured organization that has given way to the "cross functional" team must immediately and effectively adapt to such changes—or be left choking in the dust of progress. The tools and strategies that make it possible to adapt to change evolve just as quickly.

Mike Zisman, formerly vice president of communications products at Lotus and now that IBM subsidiary's CEO, recently put a face to this challenge during a gathering of IBM Software Solutions Division employees. Wanting to buy a special gift for his daughter's upcoming birthday, a book that had a significant emotional impact on him around the time of his own 14th birthday, he went to a prominent national bookstore chain located in Cambridge, Mass., with the full intention of purchasing a copy.

When told by a store employee that they no longer carried the book, he initially conceded defeat and began to consider an alternative gift. But once back home, he decided he would search the Internet's World-Wide Web to see if he couldn't muster up a copy.

During his search, he found the virtual storefront of an independent counterculture bookstore located in Southern California, one which had been in business since the late 1960s. Their online catalog indicated that they had two copies of the book in stock, so he picked up the phone and called the 800 number provided in the Web site. The clerk on the other end of the line informed him that they'd recently sold both copies but that another had just come in. Would he like to order by credit card and have it shipped to him overnight?

It would be stating the obvious to acknowledge that an independently owned business located clear across the continent had just taken business away from a rapidly growing national bookstore

chain, but I'll state it just the same. To rephrase Sun Microsystems' slogan—the network is *not* the computer—rather, it's the infinite web of relationships that the computer makes possible.

### A Cosmic Coupling

The seemingly cosmic forces that brought the culturally disparate likes of IBM and Lotus together as one may be more earthly than is apparent. Like finding a needed book all the way across a continent, a transaction has taken place that unites the paragon of business enterprise computing that is IBM with the company that helped settle the frontiers of desktop personal productivity that is Lotus.

But a metamorphosis much more profound than a mere corporate merger has transpired—one that paves the way beyond the PC, beyond mere operating systems, beyond Lotus Notes, beyond even the vast network called the Internet.

It is a transformation that will result in the construction of a strategy built entirely upon the shifting foundation of relationships. For if business is indeed a web of connections consisting of customers, competitors, vendors, departments, divisions—of *people*—it must move beyond brokering a mere exchange of information and instead concentrate on facilitating the imperative communication and free flow of ideas that make organizational entities more competitive in a global business environment, one whose geographical boundaries know no end, whose cultural diversity knows no limits, whose temporal restrictions have been erased.

Like it or not, the new mercantilism will sanction commerce seven days a week, 24 hours a day, 365 days a year in every country around the globe. There won't be any "blue" laws in cyberbusiness—just ask your local Internet access provider. Perhaps Nicholas Negroponte, founding director of the Massachusetts Institute of Technology's Media Lab and the Luddites' worst nightmare, put it best when he suggested in his recent book, *Being Digital*,

that the trade zone has been replaced by the time zone.

While Wall Street darlings such as Netscape continue to escalate the production of secure web servers and browsers, and as mainstays such as Big Blue roll out network-centric computing strategies that enable companies large and small to take advantage of a leveled playing field, telcos around the world are enhancing the infrastructure of the Internet to prepare it for comprehensive digital commerce. I have the distinct feeling they won't be long in the process, for Internet years have rapidly become the technological equivalent of canine ones.

In this issue of *Personal Systems*, we hope you'll discover not only helpful information about some of the new technologies that IBM and Lotus are developing to assist you in better managing those relationships, but some signposts as well that will help you find your way from the old world into the new.

For while the currency of exchange may have shifted from gold bullion to information composed mainly of electronic pulses, unless we leverage our collective knowledge through what are often vast and complex webs of business relationships, we might as well have discovered the IT equivalent of a massive lode of fool's gold.



**Todd Watson**, formerly the assistant editor of *Software Quarterly*; IBM's *Magazine of Software Technologies* and */AIXtra: IBM's Magazine for AIX Professionals*, is now editor of *SQ on the Net* and a member in good standing of the IBM Software Group electronic marketing team. With Big Blue since 1991, he holds a BA degree in English and an MA in Mass Media Studies from the University of North Texas in Denton. He can be reached via the Internet at [radar@vnet.ibm.com](mailto:radar@vnet.ibm.com).

# Designing Lotus Notes Applications That Perform

*Those of us encountering applications that work just fine in limited test environments but subsequently provide unacceptable performance under a full load know that it is less painful to do the necessary design work up front, rather than redesign an application already in use. This article, based on experience with Lotus Notes Release 3, recommends ways to design applications for the best performance right from the start.*

**F**rom a user's perspective, Lotus Notes application performance is measured in response time at the client workstation. The most time-consuming elements are loading and viewing an application and saving a document or form.

In fact, several factors affect response times and some involve trade-offs. It is often necessary to sacrifice some program function in order to improve overall performance. Conversely, adding special functions may require giving up some performance.

---

Lisa Woody  
IBM Corporation  
Roanoke, Texas

---

may not be significant; but because Lotus Notes applications tend to grow, it is wise to always design for performance. The following, then, are some suggestions for designing your next Notes application.

## Views

A *view* in Lotus Notes is an organized way to display fields from documents, so that documents, and the information within them, can be easily located. A view can serve as a simple report; however, because users like to slice data many ways, it is tempting to design a large number of sophisticated views for a database. Before doing this, it is important to remember that behind every successful view stands an *index*, the structure that is built to enable a view to display.

A user measures a view's performance by how long it takes to open; that time is based upon how long it takes to build the index. (In severe cases, I have seen views take almost an hour to open!) The main factors in a view's performance are:

- How often the view is out of date
- How often the view is rebuilt

- How large the view is
- How complex the view is
- How many views there are

When a document is added, changed, or deleted, its view is outdated and is added to a queue, indicating that it needs to be updated. At selected intervals, the Update task, which runs on the server, will update that view, based upon the index setting.

## Index Settings

The *index setting* for the view is set in View Attributes and has three options: Automatic, Automatic-at most every xx hours, and Manual/Background. The default setting for a view is *Automatic*, meaning that an out-of-date view is updated whenever it is opened by a user. Therefore, in a volatile database, if a view is opened by a user before the indexer has rebuilt it in the background, the view may be rebuilt while the user waits.

*Automatic-at most every xx hours* forces the view to be rebuilt only after the specified interval xx has passed. This means that, in many cases, the view will open for the user immediately. A yellow icon with a black question mark in the corner of the view will notify the user that the view is out of date, and the user can choose to refresh the view if desired.

With the third index setting option, *Manual/Background*, the view will always open immediately because it is never rebuilt at opening. If the view is out of date, the user will be informed via the yellow icon and can choose to explicitly rebuild the view. Of course, server tasks will still rebuild the view in the background.

Carefully considering and selecting the index setting option can make a big difference in the response your users see, so consider changing the default for selected views.

### Improving View Performance

Since each change to a document can potentially affect more than one view, it becomes clear that the number of views in a database also affects performance. If the server is busy updating multiple views, it cannot be responding to other user requests. That's why it is a good idea to limit the number of views in a database. In fact, the rule of thumb is to try to keep the number of views in an application to a minimum and to make each view as simple as possible.

Lotus Notes Release 4 is expected to improve the indexer's performance. In addition, Release 4 may alleviate the need for some views, because it offers the user some ability to sort and resize view columns on the fly.

In a case where a large number of specialized views is needed, consider making those views private. Private views are built and stored on the user's workstation and do not affect server performance.

The size of a view and its index is the major factor in how long the index update takes. The number of documents selected for the view and the number of columns in the view directly affect the index size. Documents categorized on multi-value fields may appear in multiple categories and may considerably increase the view's index size.

Views whose column definitions contain many or complex formulas are also candidates for improvement. Moving a calculation from a column to the form will often dramatically speed up the opening of a view. Although a calculation done once in a form may not be noticeable, that same calculation done for thousands of documents in a view may seem to take forever.

Sorted columns take longer to index than unsorted columns, and categorized columns take longer still. If you add a sorted or categorized column to a view (which previously had neither), indexing time will noticeably slow down. Additional sorted or categorized columns

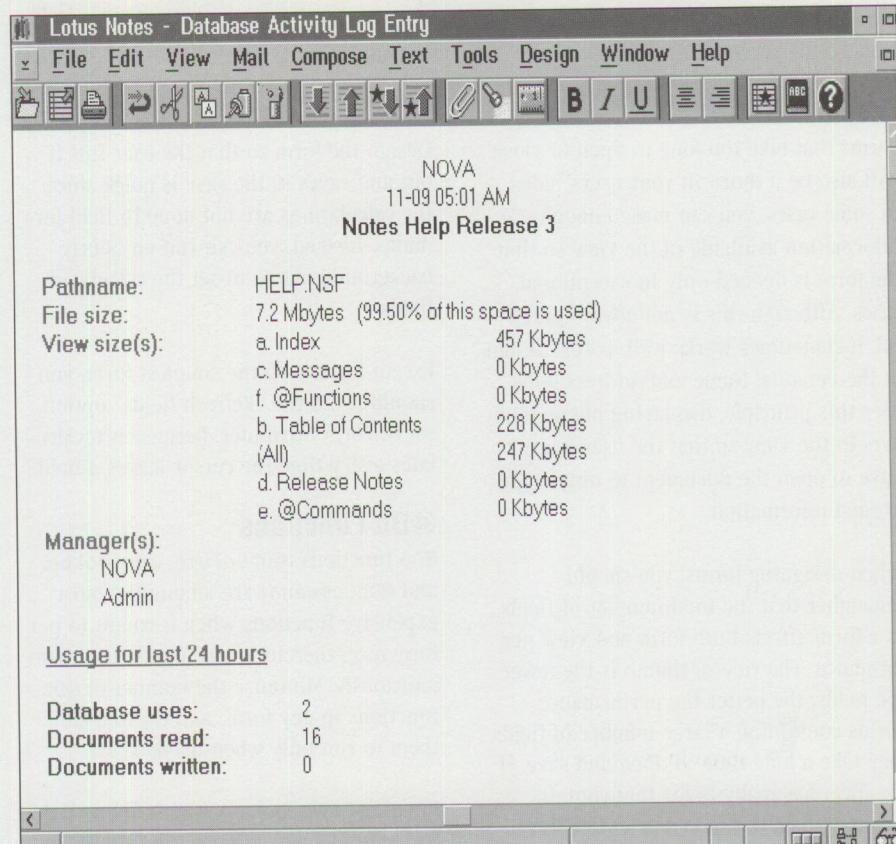


Figure 1. Server Log Entry Showing View Sizes

also contribute to a slowdown, but subsequent slowdowns will decrease in severity.

Keep selection formulas as simple as possible, and avoid selection formulas that use time/date functions as they will continually render the view out of date. Reducing the complexity of the formulas contained in a given view's design can significantly improve that view's performance. The more documents contained in a view, the more noticeable the improvement will be if you implement such a change. Time functions that depend upon the present clock will be slow, because the view indexes must be rebuilt each time the view is entered. An example is having the function @Now in the column formula.

You can determine how large your views really are by looking at the appropriate Database Sizes document, found in the Database Sizes view in the Notes server log (see Figure 1). In a large database, each index can take a considerable amount of space. In fact, the maximum size of a view in Lotus Notes Release 3 is 130 MB, a substantial percentage of the total database's 1 GB limit.

When you look at the server log, you may be surprised to see that some views are very large, while others are listed as 0 (zero). That's your clue about views that your users are not using. Depending upon the index options, the view may not be built until a user asks to display it, so a view with 0 size likely has zero users. Those views are excellent candidates for deletion.

Unread marks, which provide a visual indication of whether or not the user has read a document, may significantly affect the performance of any given view. Try to use Unread marks only in those views that require them. If you have to use them, choosing "Unread Documents only" instead of "Compute and Display at all levels of View" can noticeably improve performance.

Finally, user education can come into play. If a Notes application is very large, users should know that performance slows down when they open multiple views concurrently. Although this is not a design issue, you should teach your users that F9 causes a refresh and should not be

used unless needed, to avoid putting extra load on the server.

## Forms

Forms that take too long to open or close will also be a thorn in your users' sides. In some cases, you can make enough information available in the view so that the form is opened only in exceptional cases. Although this is not always practical, it sometimes works well. Lotus' design of the Personal Name and Address book uses this principle, displaying phone numbers in the view so that the user doesn't have to open the document to obtain the needed information.

When designing forms, you should remember that the total number of fields in a form affects both form and view performance. The rule of thumb is the fewer the fields, the better the performance. Forms containing a large number of fields may take a long time to open and save. If the form has many fields that contain summary data (i.e., non-rich text fields), it will also affect views, because summary data is loaded as part of building the index.

Earlier, I recommended that you move calculations from view columns to fields in the form. Unfortunately, a large number of calculations in a form will affect the form's performance, so it is helpful to design your application so that these calculations are done only when necessary. Computed fields are recalculated every time a document is saved, whether or not they need to be calculated.

"Computed for Display" fields allow data to be displayed that is not physically stored. Try to take advantage of these fields for data that does not need to be displayed in a view. There are probably many instances where database fields are needlessly calculated and stored, based on values in other fields that remain constant. You can designate all of these types of fields as "Computed for Display," which reduces total document size and improves performance.

Many developers use buttons to provide a friendly user interface, but the cost may be more than you realize. A button designed to save a document may double the time to save, since both the button and the save cause a semi-recalculation. In

a large form, this can try a user's patience.

Batching calculations can save time. Design the form so that the user fills it out and saves it; the save is quick since the calculations are not done in field formulas. Instead, you can run an hourly background macro to set the calculated fields.

Except for use on the simplest form, you should avoid the "Refresh fields" option, set in Form Attributes, because it recalculates every time the cursor leaves a field.

## @Db Functions

@Db functions (@DbColumn, @DbLookup, and @DbCommand) are among the most expensive functions when it comes to performance; therefore, you should use them judiciously. Minimize the number of @Db functions in any form, and try to code them to run only when needed.

Never use two lookups where one will do. For example, you can use the formula in Figure 2 to test for @DbLookup errors by setting a temporary variable to the value returned by the lookup, then testing that variable to see if an error was encountered. If there was no error, the value is available in the temporary variable for your further use.

If you need to look up more than one field related to the same keyword, use a single @DbLookup to return a list of concatenated values, rather than doing multiple lookups that each return a single piece of data. The resulting list can then be parsed, and the fields can be set, as shown in Figure 3. Figure 3A shows the actual view, Figure 3B is the column formula, and Figure 3C is the button formula.

Design your application so that the lookups are done only when necessary. Computed fields are calculated every time a document is saved. If a field's value is determined via a lookup, but its value is not expected to change often, consider putting the @Db function into a button

rather than into a field formula. In this way, the user can control when to run the formula.

Keyword fields with values populated by a lookup cause that lookup to be done every time a document is opened, even for a read. For documents that are frequently read but seldom edited and that contain keyword fields populated by @DbColumn commands, try a special formula. By using an @If statement with a clause such as @IsNewDoc or @IsDocBeingLoaded, you can control when the lookup takes place.

Code lookups for efficiency: if the data in the view does not change often, use the Cache option (the default in the lookup formula). This enables a view used for lookups to be cached in memory where it can be reused, thus saving time. Of course, where it is critical for the looked up data to be current, the NoCache option can be used, at the expense of performance.

If you are looking up a rich-text field, you must use the field name for the lookup value. Otherwise, it is faster to use the column number, because the data can be pulled from the view index. When the field name is used, the entire document must be read.

Finally, create either a small external database designed for lookups or specialized views that perform efficiently. Much of the time spent in a lookup can be in opening the view, and as discussed above, views in smaller databases perform much better. Limiting the number of documents in a lookup view and keeping those views up to date can increase performance of these functions.

## Overall

Applications may function better by splitting a large database into smaller logical units. For example, lookups for personnel information may be better accommodated by a stand-alone personnel database, rather than storing all of the information

```
temp := @DbLookup("", "Server": "Database"; "View1"; key; 2);
FIELD Value := @If(@IsError(temp; "Error doing lookup"; temp)
```

Figure 2. Testing for DbLookup Errors

in the main application. (See the article "Designing a Scalable Lotus Notes Workflow Application" in this issue for another creative solution for splitting large databases.)

## Hardware Considerations

As in all applications, hardware plays a part in Notes application performance. Since views are built on the server, server factors such as memory and processor speed affect view performance. Workstation configuration, on the other hand, is more likely to affect form performance. Network bandwidth between client and server can also impact performance.

It is always wise to test your application on machines configured like those of your users. It's easy to get away with sloppy design techniques on a 100 MHz Pentium system when the database is local, but that same application may prove unacceptable on a more moderately configured machine communicating across the network to a remote server.

## Science and Art

Designing a Notes application is both a science and an art. The science is in knowing the techniques for efficient programming. The art is in making the trade-offs between function and performance. Careful planning and design at the beginning can help you create applications your users will appreciate. Happy designing!



**Lisa Woody** is an advisory market support representative in the Lotus Notes Competency Center within the Personal Systems Competency Center, Roanoke, Texas. She assists

customers and the IBM field force with technical issues related to Notes application development and deployment. Since joining IBM in 1979, Lisa's jobs have included large account systems engineer, office systems specialist, and image specialist. She has an A.B. degree from Princeton University. Lisa recently learned to eat sushi and even enjoys it. Her e-mail IDs are: via Notes, Lisa.Woody@lonestar.notes.net, and via Internet, lwoody@vnet.ibm.com.

| Name    | Lookup Column                            |
|---------|--|
| Alex    | 1-1876 Tiger Street,Austin,TX,76543      |
| Joachim | 12-31,222 Eagle Drive,Austin,TX,76222    |
| Lisa    | 3-12,123 Main Street,Cincinnati,OH,45208 |
| Rufus   | 10-4,999 Oak Street,Dallas,TX,77777      |

Figure 3A. View for Button Doing Multiple Lookups

**Design Column Definition**

**Title:**

**Formula:**

**Width:**  characters

**List Separator:**  Space  Semicolon  Comma

Figure 3B. Multiple Lookup Column Formula

**Insert Button**

**Button Text:**

**Word Wrap:**

**Formula:**

```
list := @If{Name = ""; ""; @DbLookup(""; ""); "Info"; Name; 2]);
FIELD DOB := @Subset(List; 1);
FIELD Address := @Subset(@Subset(List; 2); -1);
FIELD City := @Subset(@Subset(List; 3); -1);
FIELD State := @Subset(@Subset(List; 4); -1);
FIELD Zip := @Subset(@Subset(List; 5); -1);
""
```

Figure 3C. Multiple Lookup Button Formula

# Designing a Scalable Lotus Notes Workflow Application

**When designing a Lotus Notes application, the ability to handle large amounts of data becomes a critical concern. This article highlights some relevant issues and describes the application that the author designed and implemented for an international hotel chain using Lotus Notes Release 3.**

Lotus Notes Release 3 was the requested platform for implementing a complete Sales Information System (SIS) for approximately 100 sales management locations of an international hotel chain. Previously, the hotel's process of working with customers, organizations, clients, correspondence, leads, and contracts had been conducted with a paper process. Communications were handled exclusively via fax and phone.

---

**Norm Saslowsky**  
**IBM Corporation**  
**Roanoke, Texas**

---

databases used for data reference that are associated with the primary database. In a multi-server environment, all the databases are replicated between servers at regular intervals (see Figure 1). Replication is the means by which Notes synchronizes data across the enterprise. This model's key constraint is that a Notes Release 3 database cannot exceed 1 GB in size. (*Note:* This constraint is eliminated in Release 4.)

The key requirements for the hotel chain's SIS application are:

- More than 1 GB of existing data needs to be preloaded into the Sales Information System before the application can be placed in production.
- Specific security requirements demand that leads generated in SIS cannot be shared globally until the lead process completes.
- Even though a Notes database is typically replicated twice a day across the enterprise to other Notes servers for data sharing, the SIS lead process needs more frequent replication for its rapid communications.

## Requirements

The hotel's requirements for the SIS mean some modifications must be made to a typical Lotus Notes application design. A typical Lotus Notes application consists of a single Notes database containing primary data, but there may be additional

- Many users of the SIS application are novices, so strict validation controls are mandatory.
- The end-user interface needs to be simple and easy to learn.
- The workflow process needs to be automated and as transparent as possible to the user.
- To gain user acceptance, the SIS application must perform well.

The challenge is to design a solution to incorporate all the user requirements without exceeding the limits of the Lotus Notes environment.

## Application Structure

The critical factor influencing this application's design is the need for a structure that can handle large amounts of preloaded, existing data in the Sales Information System. Therefore, the data for the SIS application needs to be split across multiple Notes databases.

Figure 2 gives a simplified look at some of the forms that constitute the hierarchy of



the Sales Information System. The organization document, at the top of the hierarchy, is the logical place to consider dividing the data. To handle all the anticipated data for the enterprise, separate, "global" Notes databases are created.

For SIS, I created 26 global databases. Each global database contains data that is divided alphabetically by organization and is intended to store the entire hierarchy of data for its organization.

The "A" global database contains all the data records associated with organizations starting with the letter "A," and so on. These global databases contain the accumulated data for the SIS application for every sales manager server location. The data in the global databases is shared across the enterprise via standard Notes replication.

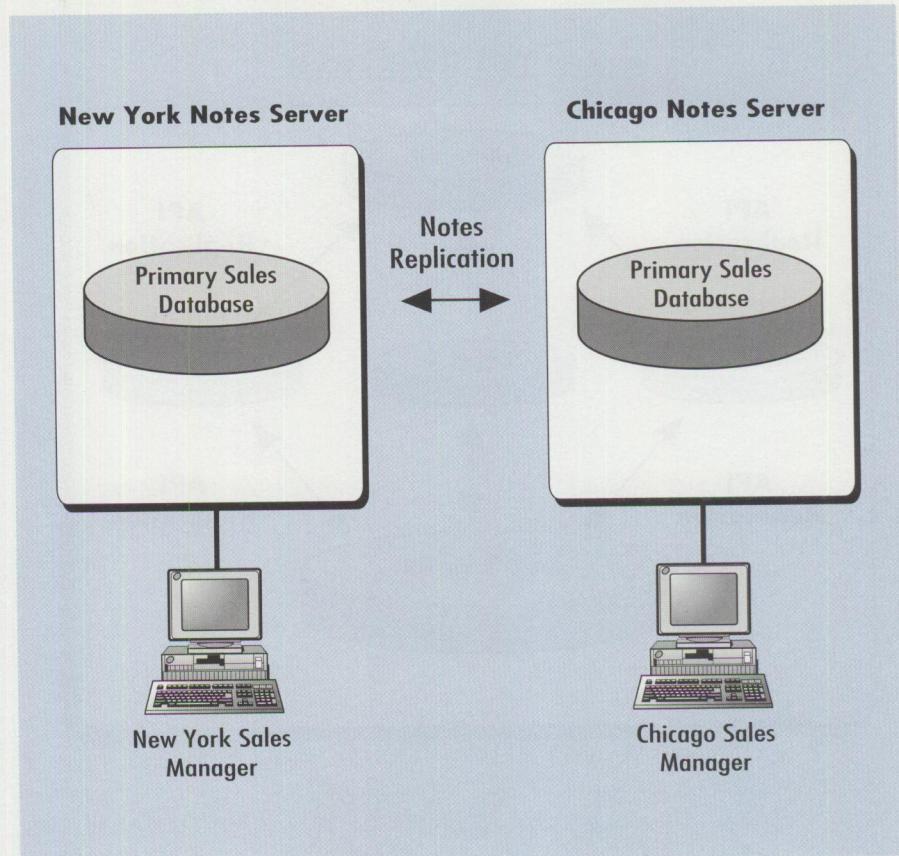
By splitting the data across all the global databases, each database contains a manageable data volume for the life of the application.

The global databases are used under the covers in the workflow process. The user does not see any of the global databases on his or her Notes desktop—their use is transparent.

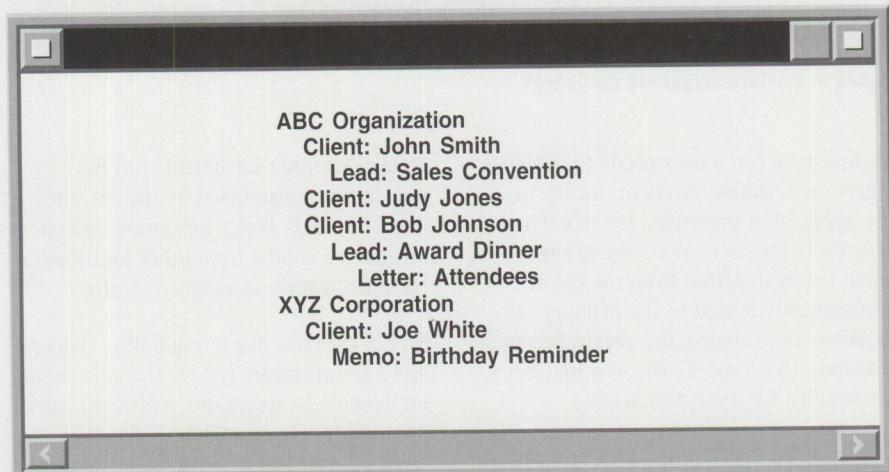
All the documents in the global databases are "read-only" for viewing and reference. Each sales manager performs all work directly with his or her "primary" SIS database. Each primary SIS database, unique at each server location (see Figure 3), contains all records for that location and does not replicate across the enterprise.

Another database used at each server location is called the "Index" SIS database. Containing all the records for that location, data in the Index SIS database is read-only and does not replicate across the enterprise. The challenge here is creating a single source Notes database that provides views of all the records in the global databases. How can we do this if we have more data in the global databases than one standard Notes database can accommodate?

The solution is to replicate (using the Notes API), from the global databases to the Index database, just the subset of



**Figure 1. Typical Notes Replication Model**



**Figure 2. Sample Data Hierarchy**

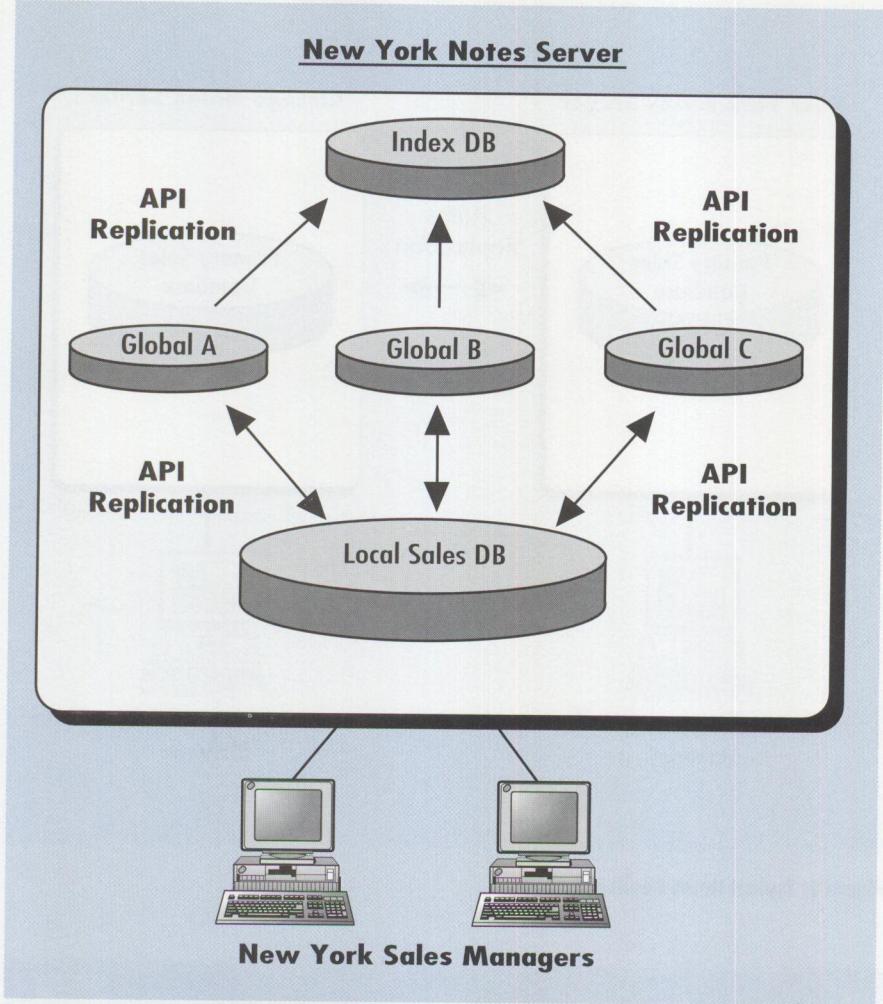
data necessary to produce the views. A doclink (similar to a hypertext mark) is also created in every document in the Index database. By selecting the doclink, the user can navigate directly to the complete record in the global database.

### Document Control

Since Lotus Notes does not provide record locking, strict document control is required to enable the SIS application

to prevent possible replication conflicts. For example, across the enterprise, many sales managers may need to share the same organization and client documents. However, only the original owner of a document is allowed to make any modifications.

To control the conflicts that can come from multiple editors addressing the same document, the SIS application design allows only a single author of each



**Figure 3. Primary Server SIS Databases**

document. When a user needs to compose a new organization or client document, the application presents a list of current records. If the user selects the desired client or organization from the list, it is automatically copied to the primary SIS database. Once copied, this record becomes read-only. (We'll see shortly how updates are handled for these documents.)

These copied documents never replicate back into the global database—they are maintained by the original author. If the user composes his or her own organization or client record, the user becomes the author, and these records are made available for use across the enterprise.

## Security

Except for local administrators, all users are defined as “author” in the Access Control List. Every document in the SIS system has an author.

For organization and client documents, only an administrator can assign a new

owner. All other documents can have new authors reassigned by the current author as well. For organization and client documents copied from other locations, a “contact” author is assigned locally.

No SIS user has delete capability. Owners and administrators can “mark” documents for deletion in accordance with strict rules. An application programming interface (API) running in the background controls the actual document deletion process.

Many of the automated processes use the clipboard to transfer documents from the global databases to the Main database. One of the functions of the mail/paste macro is to disallow arbitrary pasting of any document into any of the SIS databases.

## Lead Process

Leads are documents created by the sales managers. They are selectively mailed to all locations that may be able to capitalize on the lead. The lead originator then waits for responses from each location.

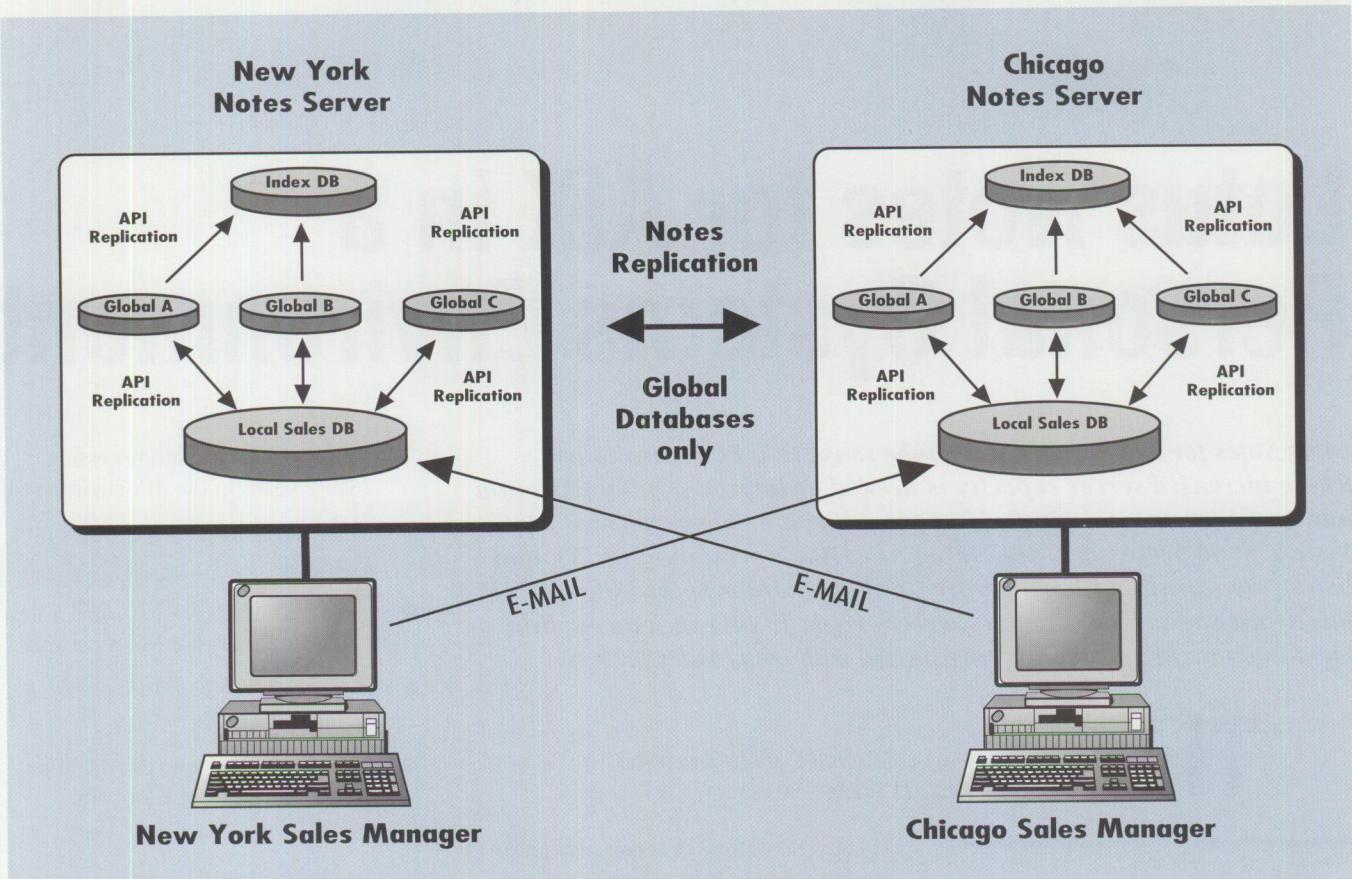
After the responses have been returned, the lead originator sends a resolution document to all locations indicating which location won the business and giving the reasons why other locations did not win. This lead process is confidential and cannot be shared between locations until the resolution is sent.

Following is a simplified example of the lead process:

1. After the lead document is complete, the lead generator creates the hotel distribution list and mails the lead.
  - a. The original lead is assigned a new form that freezes data locally but allows additional mailings.
  - b. The lead being mailed is assigned a new form, tailored for each receiving location, and is placed directly into each receiving primary SIS database.
  - c. A tickler memo is mailed to the administrator at each receiving location for lead assignment.
2. Each receiving location composes a response to the lead, which is automatically mailed back to the lead originator.
  - a. This response is assigned a new form for both the sender and receiver.
  - b. The response is mailed directly to the lead originator's primary SIS database.
3. The lead generator composes an award resolution record that is automatically mailed to the original distribution. New forms are assigned.
4. The awarded location completes the contract, which is automatically mailed to the lead originator. Specified records for the lead process can now be replicated to the global SIS database for general availability.

The requirements defined for the SIS application illustrate the need to handle the lead process outside the normal planned replication schedule. Significant private communications must take place during the course of the lead process, and the sales contract needs to be completed before general users view these records. The lead process, therefore, uses Notes e-mail to satisfy these requirements.

By mailing documents directly into selected location primary databases, the lead owner can speed up the process and



**Figure 4. Multiple SIS Server Locations**

control which locations can access the documents.

### API Document Processing

The API designed for the SIS application runs in the background at each sales manager location server, monitoring all the databases at specified intervals.

Following are some of the functions performed at one-minute intervals:

- If any records marked for deletion are parent documents, all the children in the hierarchy are also marked for deletion.
- Since all reporting is done off the lead document, any key data changes in related documents are transferred to the lead.
- New data contained in specific records is processed and exported to existing legacy systems.
- Documents mailed into the primary SIS database are checked for duplicates, and older copies are deleted.

Following are some of the functions performed twice daily:

- All child documents in the hierarchy are updated to reflect any changes to their parent documents.
- All documents marked for deletion are removed from the primary SIS database and placed in a special deletion database for archival.
- Local replication (see Figure 3):
  - All designated modified documents in the primary SIS database are replicated to the correct global database.
  - All modified organization and client records in the global databases are used to search for existing copies in the primary SIS database. Matched records are then updated.
- Index replication:
  - Specific data in modified global records is replicated to the Index SIS database.

— Doclinks are created for new records in the Index SIS database.

### Notes replication (see Figure 4):

- All the global databases are replicated throughout the enterprise via normal Notes replication.

### Crisp Performance

Although this is a complex application, the user seldom needs to leave his or her primary SIS database during the entire workflow process. Most of the replication process takes place during off hours, and performance is crisp because the user generally works with the primary SIS database.

**Norm Saslawsky** is an advisory programmer in the IBM Personal Systems Competency Center, Roanoke, Texas. He is the center's lead Lotus Notes application developer. His previous assignments included technical support and training for Lotus Notes application development; technical support for Personal AS; and programming and PC support. Norm joined IBM in 1979. He can be reached via Internet at nsaslawsky@vnet.ibm.com.

# Lotus Notes for AIX in a Personal Systems Environment

*Lotus Notes for AIX servers may make sense in a PC environment where increased server capacity is needed or improved administration and management is desired. After providing a brief overview of RISC System/6000 processors, describing AIX (IBM's version of UNIX), and listing the software and hardware prerequisites for Lotus Notes for AIX, this article shows how AIX Notes servers might fit into such an environment and provides tips for getting started with Lotus Notes for AIX.*

**H**ey, isn't this supposed to be *Personal Systems* magazine? What is something about *AIX* doing here anyway?

---

Rufus Woody III  
IBM Corporation  
Roanoke, Texas

---

A Lotus Notes for AIX server may make perfect sense in your personal systems environment. How, you ask? Read on, where I'll discuss:

- Why you might consider an AIX Notes server in a PC network, including:
  - What a RISC System/6000 is
  - What AIX is

- What symmetric multiprocessing (SMP) means in the AIX environment
- What a Scalable POWERparallel (SP) system is
- Some conclusions on what Lotus Notes for AIX can do in your Notes network
- The software and hardware prerequisites for Lotus Notes for AIX
- How to get started with an AIX Notes server if it makes sense for your situation

## Lotus Notes for AIX is Lotus Notes

Almost without exception (more about the exceptions later), Lotus Notes for AIX is Lotus Notes. That's the good news! It's still the same client/server-based groupware that leads the industry in helping teams work better together. It still supports PC-based (and other) Notes clients connected over the most popular network



protocols to the Notes server—in this case, a Notes server running on AIX, IBM's award-winning UNIX operating system.

### Notes Clients

Which clients does Lotus Notes for AIX support? An AIX Notes server can support Lotus Notes clients that are running:

- IBM OS/2
- Microsoft Windows
- IBM AIX (See Figure 1)
- Other versions of UNIX, including:
  - Santa Cruz Operations' SCO ODT
  - Hewlett-Packard's HP-UX
  - Sun Microsystems' Solaris
- Apple Macintosh System 7

This is a complete set of Notes clients.

### Notes Protocol Support

Which network protocols does Lotus Notes for AIX support? An AIX Notes server can support connections via:

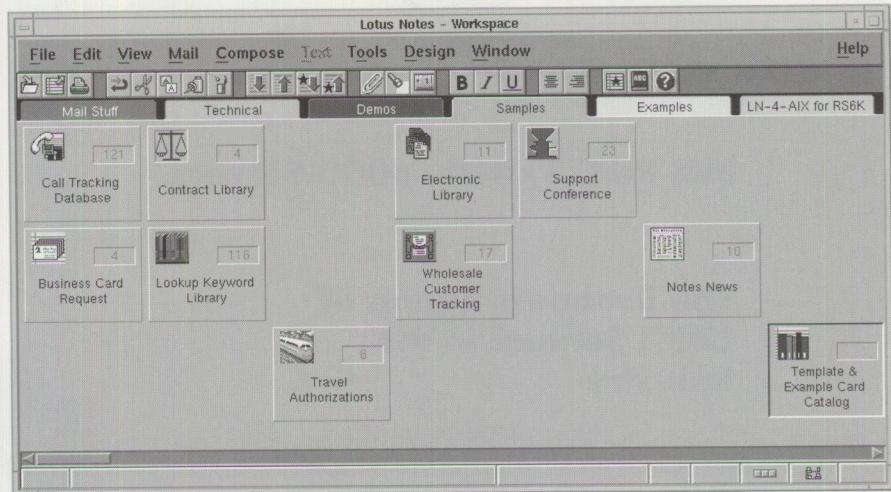


Figure 1. A Lotus Notes for AIX Desktop (Looks just like an OS/2 Notes desktop, doesn't it?)

- Transmission control protocol/internet protocol (TCP/IP)
- Novell's sequenced packet exchange (SPX) protocol
- Notes' X.PC protocol (often used by dial-in users)

At the UNIX Expo in New York last September, the IBM booth demonstrated

connectivity between AIX Notes servers and OS/2 Notes servers, as shown in Figure 2.

With Notes Release 4 (R4), Notes clients will also be able to connect to or from an AIX server and to servers running other protocols, using Notes R4's passthru server support. Simply put, clients connecting to a Notes server using protocol *A* can

### Multiple Servers and Clients Sharing Common Databases

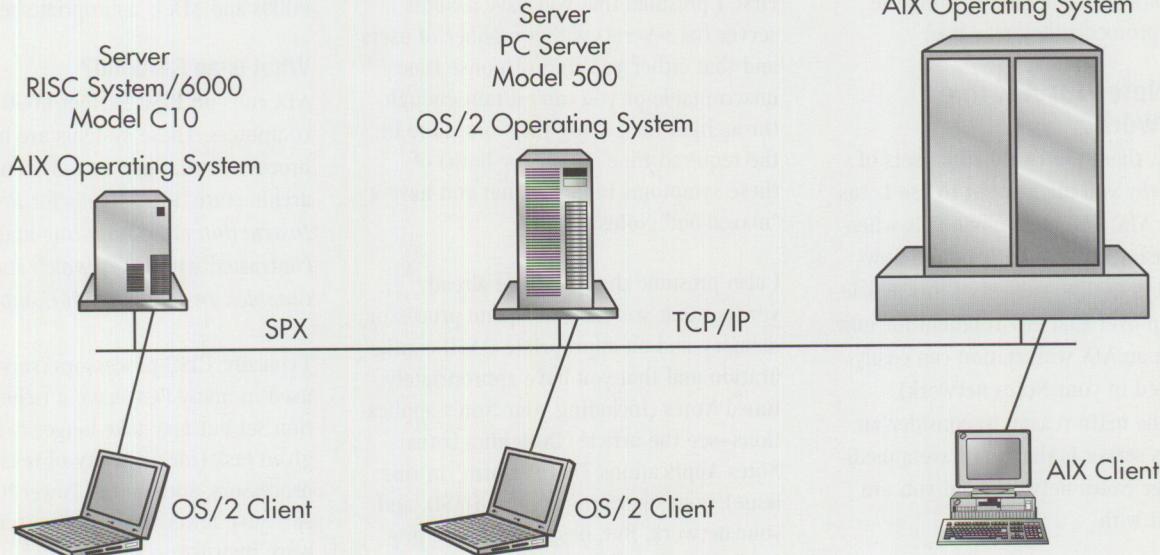


Figure 2. Lotus Notes for AIX and OS/2 at UNIX Expo

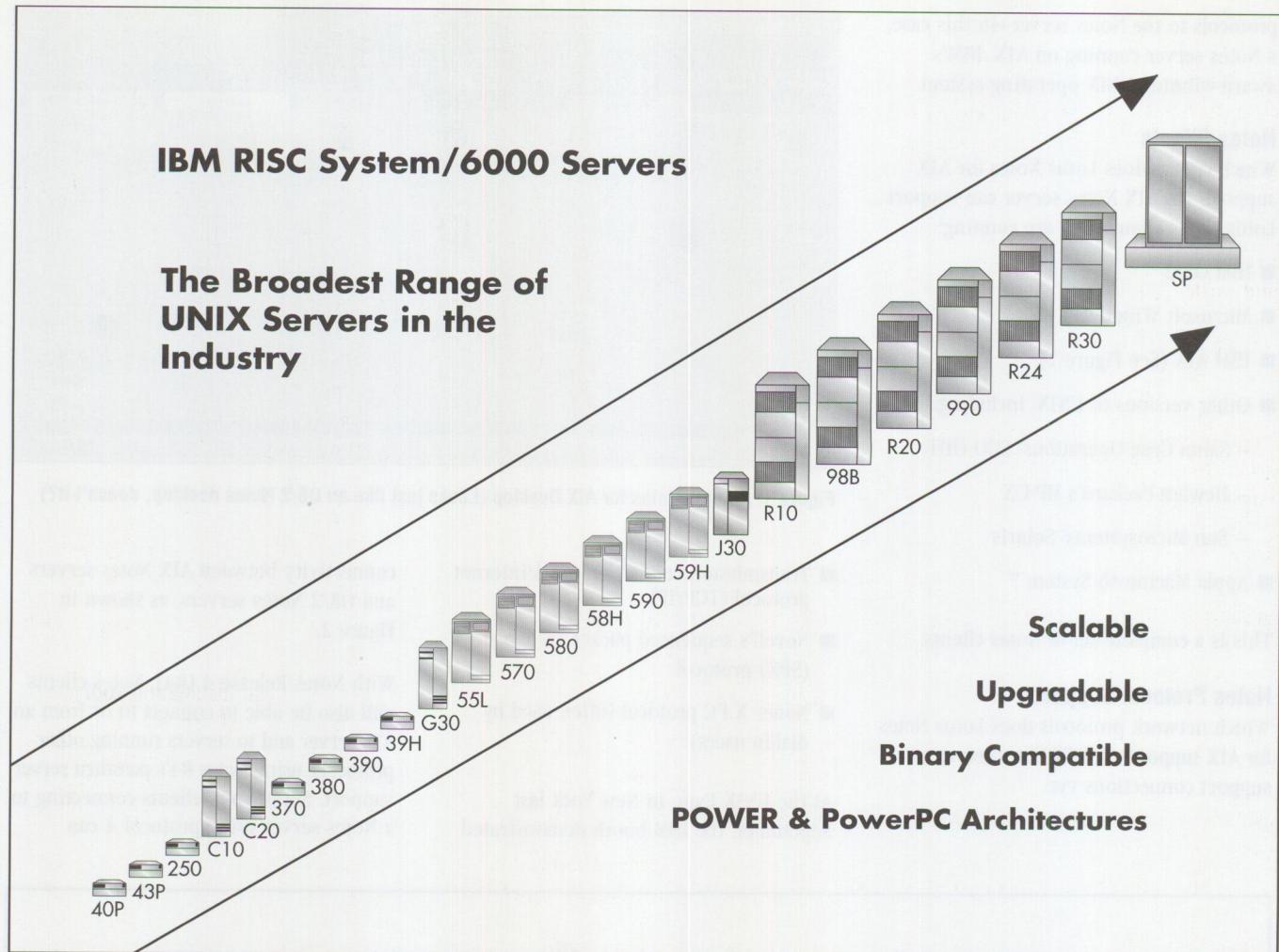


Figure 3. RISC System/6000 Servers from Smallest to Largest

connect to another server using protocol *B* as long as the two Notes servers have some protocol in common (among the multiple protocols they may use).

### Lotus Notes for AIX in a PC Network

Generally, there are two distinct sets of reasons why you might want to use Lotus Notes for AIX. The most obvious is when you are using an AIX workstation; however, that is not the subject of this article, so I'll skip over that environment for now (although an AIX workstation can easily be included in your Notes network).

Usually, the main reason to consider an AIX Notes server is that you have a medium-to-large Notes network, and you are concerned with:

- Maximum server capacity, and/or
- A growing systems management (administration) requirement

I'll examine each of these briefly.

First, I presume that you have a Notes server (or several) with a number of users and that either you find response time unacceptable or you can't attain enough throughput for getting the work done in the required time. Either (or both) of these symptoms indicates that you have a "maxed-out" Notes server.

I also presume that you have already verified that you have adequate processor memory and an appropriate DASD configuration and that you have appropriately tuned Notes (including your Notes applications—see the article "Designing Lotus Notes Applications That Perform" in this issue), your operating system, DASD, and your network. But, despite all these precautions, you still have capacity and/or performance challenges.

Why should you consider an AIX server for Notes? A brief tutorial on RISC System/6000s and AIX is appropriate here.

### What is an RS/6000?

AIX runs on RISC System/6000 (RS/6000) computers. These systems are based on processors that use a finely tuned RISC architecture. RISC stands for *Reduced Instruction Set Computing* and can be contrasted with CISC, which stands for *Complex Instruction Set Computing*.

Typically, CISC processors (such as those used in many PCs) have a richer instruction set but may take longer to execute a given task (for a variety of reasons). RISC processors, such as the PowerPC processor, have fewer instructions in their hardware instruction set but execute these instructions in fewer machine clock cycles. RISC processors' architecture often takes advantage of overlapping processing cycles to achieve significantly higher throughput.

Some RS/6000s are based on POWER or POWER2 chips. POWER stands for Performance Optimized With Enhanced RISC, and POWER2 can be thought of as a second-generation POWER chip. The PowerPC is a newer RISC architecture that was jointly developed by IBM, Motorola, and Apple Computer. PowerPC processors are being used in the newest RISC System/6000 and have excellent performance characteristics.

RS/6000s, depending upon the model and its features, support a variety of features and attachments including:

- LAN attachments via Token Ring and Ethernet
- DASD attachment via small computer system interface (SCSI—several varieties) and peripheral component interconnect (PCI) buses
- Asynchronous communications
- CD-ROM and 8 mm tape drives

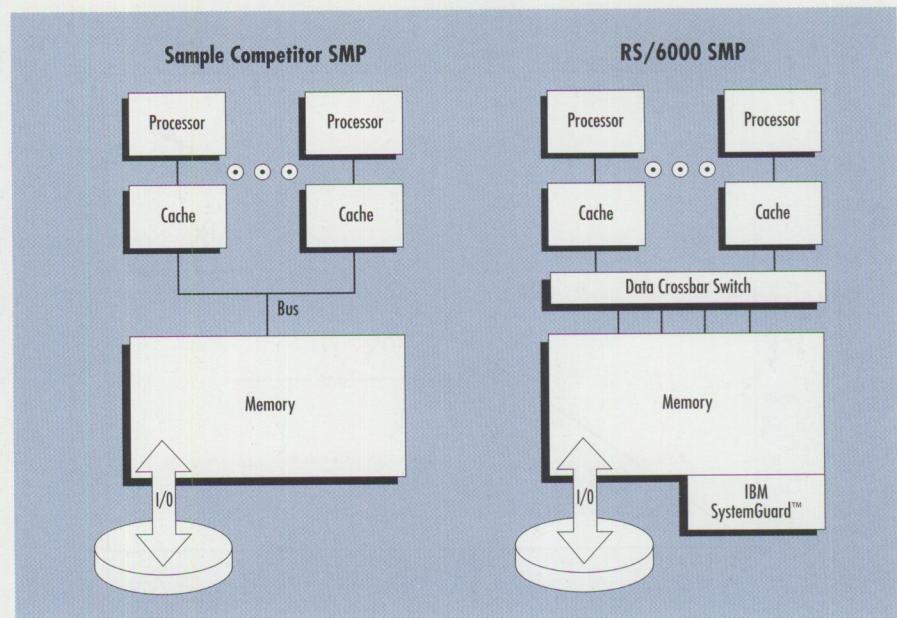
The RISC System/6000 hardware architecture, including its multi-level I/O caching scheme, is known throughout the industry to be an excellent performer. Figure 3 shows the broad range of RISC System/6000 servers available. These range from single-engine servers to those supporting SMP to scalable POWERparallel systems. SMP and SP are discussed in more detail below.

### What is AIX?

AIX is IBM's award-winning, high-performance, UNIX-based operating system. You may ask, "Isn't AIX just UNIX, and isn't UNIX scary?" The answer to both questions is yes—and no.

AIX certainly has foundations in UNIX. UNIX has been around since 1969, which is slightly longer than PC-based operating systems, I might add. (In fact, some PC operating systems have taken many features from UNIX.) UNIX has undergone many improvements by many organizations and is still growing in its number of users and in functionality and usability.

AIX is IBM's version of UNIX. AIX has been around since 1986 in one of several forms. On the RS/6000, it is in its fourth major version, with several releases and modification levels within each version. AIX's advanced file system architecture has excellent performance and reliability.



**Figure 4. RS/6000 SMP Architecture on AIX Version 4**

The AIX virtual memory management system is designed for maximum performance, reliability, and flexibility.

### Notes System Management and Administration

Notes system management and administration are two closely related aspects of the same thing. Of course, you have to manage both the servers and the clients. Notes users typically won't see many benefits by consolidating several servers onto fewer AIX Notes servers—unless you can consolidate all users onto one Notes server, thereby eliminating server-to-server replication and server-to-server mail routing. (This might eliminate using a server name when mailing, for instance.)

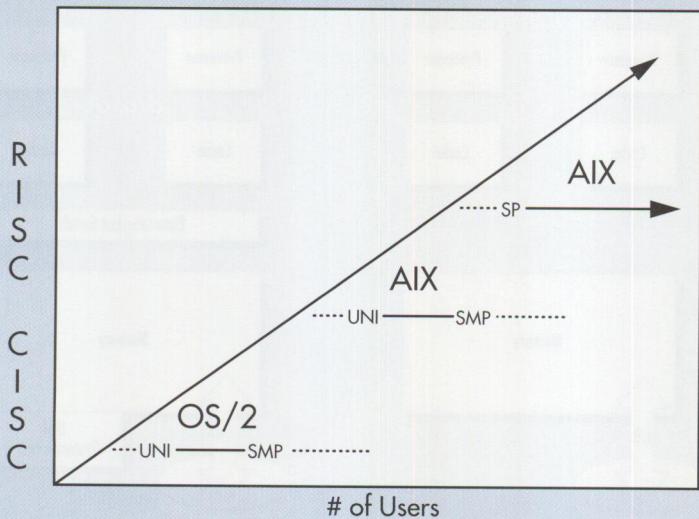
But, as a server or Notes administrator, you may see some benefits if you have several servers that could be replaced by fewer servers, thereby saving some administrative overhead. It could mean that you have to manage fewer system backups, do fewer server logins to administer the network, and have fewer systems on which to install quarterly software upgrades. You'll also have less hardware requiring preventive maintenance, hardware upgrades, uninterruptible power supplies (UPSs), and network and LAN connections.

Two major tools in AIX make it easier to use and easier to manage than other UNIX variants—easier in some cases than PCs. The first tool is called System

Management and Installation Tool (SMIT). SMIT is an easy-to-learn, easy-to-use, menu-driven administrative tool with fast paths for expert users. You can use SMIT in character mode or graphical mode to define users, groups, adapters, devices, mountable file systems, directories, system environments, and network connectivity. You can also perform system backups or invoke specified DASD backups. Finally, you can use it to install and maintain IBM system software components. SMIT is one of the things that keeps AIX from being scary—especially considering what you might have heard.

The second major tool is the award-winning NetView/6000, a member of IBM's SystemView family of enterprise-wide system management products. With fewer servers in your Notes network, alerts come from fewer nodes, thereby enabling your network support staff to be more efficient. NetView/6000 is not just limited to managing AIX workstations attached to an RS/6000; it can also manage PC clients attached to your AIX Notes server(s) from a single graphical workstation.

Administration is a tricky subject when we limit it to Notes administration. Those of you who are or have been Notes administrators know that Notes administration doesn't mean just waiting to give new Notes users their ID files. There are databases to manage, servers to certify, applications to test, security to



**Figure 5. Lotus Notes Server Capacity by Platform**

ensure, systems to back up, and . . . miles to go before you sleep.

But with fewer servers to manage, you can pay attention to other details that get overlooked when you have to manage the server farm—especially if that server farm has a larger number of nodes than it should.

#### SMP on AIX

AIX Version 4 has been optimized to support SMP versions of the RS/6000. RS/6000s in 2-, 4-, 6-, or 8-way configurations—with each engine having its own cache and with multiple paths to memory through a sophisticated, high-speed data crossbar switch—overcome the bottlenecks inherent in more traditional SMP designs. (For more details about RS/6000 SMP processors, see the article titled "PowerPC SMP Servers, Entry Platform Debut" in the January/February 1995 issue of *Personal Systems*' sister publication /AIXtra: IBM's Magazine For AIX Professionals.) Figure 4 summarizes schematically how SMP works on an RS/6000 using AIX Version 4.

Beginning with Notes R4, Lotus Notes for AIX supports SMP. Why should you be interested in SMP support? The answer is capacity—more engines to process the same workload means improved scalability and, again, fewer servers to support more users.

#### Scalable POWERParallel System

What is a Scalable POWERparallel system? Formerly called SP2 but renamed SP, it is a unique system in the industry. Think of the SP as a frame with drawers into which you can put specially configured RS/6000 "nodes" connected by a high-speed communications switch and controlled by a single "control workstation," another RS/6000. (*Note:* The SP does not yet support SMP engines, so we have to limit our discussion to single-engine nodes.) Several features make the SP powerful, but let's concentrate on the three that apply to Notes servers.

First: Because the SP is based on the RS/6000 and uses the AIX operating system, all the performance and capacity examples previously discussed apply here.

Second: The high-speed switch (called simply "the switch" hereafter) is a highly scalable, full-duplex facility for pair-wise communications, operating at 40 megabytes (MB) per second in each direction. That is, nodes A1 and A2 can have a conversation at up to 40 MB per second in each direction, for an aggregate communications rate of 80 MB per second for that pair. Nodes B1 and B2 can also have a conversation at up to 80 MB per second at the same time. Nodes C1 and C2 . . . you get the picture. What is the limit? For all practical purposes, the limit is the

number of nodes in the SP divided by two (to get the number of concurrent pairs).

Since you can bolt frames together, you can currently get a maximum of 512 nodes in one SP. That means up to 256 pairs of nodes and up to 80 MB per second per pair, concurrently. That's power! (Remember, you can start with as few as two nodes and upgrade as your needs change.)

What can you do with the switch? Interactions between Notes clients and servers typically still take place via LAN connections. But what about server-to-server communications? Remember those familiar phrases "replication" and "mail routing"? If you have to have multiple nodes, high-speed replication, and/or mail routing in your environment, an SP may help accomplish this goal efficiently, using the switch.

Third: The control workstation is basically like a graphical console from which to manage the SP. It is the way you define your I/O configurations, your networking setup, and your security. It is the way in which you manage backups—even at a node or file level. (Hmmm, all my backups from a single workstation? That sounds convenient!) And, if that same control workstation is your NetView/6000 system management workstation, imagine how much you can control your server farm from a single point.

SPs can share functions among nodes—some nodes can be AIX Notes servers, while others can run other applications. Lotus Notes for AIX can run on an SP today with Notes R3 and, since the SP runs a standard version of AIX, it will immediately support an SP when Notes R4 becomes available.

#### Lean and Mean

The net of all this is that AIX on a RISC System/6000 uses what I call a "lean, mean" operating system running on a "screamer" of a machine (in my personal vernacular).

What does this mean to you? It means that an AIX Notes server, using a RISC-based operating system, can potentially support more Notes clients than another

server with a similar CISC-based configuration. If your Notes servers are maxed-out, then you may want to consider AIX Notes servers instead.

Figure 5 illustrates how CISC-based and RISC-based Notes server capacities overlap and where an SP fits. In Figure 5, note the overlap between high-end CISC servers and low-end RISC servers. Larger RISC-based SMP processors may overlap with lower-end SPs, but for maximum capacity in a single logical frame, the SP has unique advantages.

There are two subtle aspects of supporting more Notes clients on fewer Notes servers. First, while basic Notes interactive work by clients in conversation with servers is important, background work is also important. So, if you have more users per server on fewer servers, you may require less server-to-server replication than you would have with fewer users on a larger number of servers. Second, you may find there is slightly less mail routing to be done externally if you have twice as many users on a system, since some of the mail is likely to be among users on the same server.

Both of these improvements, though perhaps slight, may decrease the amount of time and network resources required for server-to-server communications. Every CPU cycle we save on background server-to-server tasks can be used to support interactive Notes client/server functions.

### **Lotus Notes for AIX Software Prerequisites**

Lotus Notes for AIX R3.x will run on both AIX 3.2.5 (which supports uniprocessor mode only) and on AIX 4.1.2+. Lotus Notes for AIX R3.x has been certified only in uniprocessor mode. Lotus Notes for AIX R4's server will support SMPs and will have AIX 4.1.3+ as a prerequisite. The Scalable POWERparallel (SP) system can run Notes R3.x on AIX 3.2.5 or AIX 4.1.2+ today and will be able to run Notes R4 on AIX 4.1.3+ when Notes R4 is available.

AIX Notes can use TCP/IP, SPX, or X.PC as its communications protocol. You can use just the SPX protocol stack if you need SPX only for Notes support. Or you can use the full NetWare for AIX product if you want this server to be a NetWare

## **Contact phone numbers:**

|        |  |
|--------|--|
| IBM    | (800) 547-1283 (IBM's Lotus Notes Competency Center)     |
| Lotus  | (800) 828-7086   |
| SHARE  | (312) 822-0932 (ask for the Lotus Notes Project contact) |
| WALNUT | (508) 466-6327   |

server in addition to being a Notes server. Both products are available from IBM.

For more details about the prerequisite program temporary fix (PTF) levels required, contact your Lotus or IBM support channels (see sidebar).

### **Lotus Notes for AIX Hardware Prerequisites**

Lotus Notes for AIX runs on any RISC System/6000 that supports the prerequisite level of AIX, the appropriate memory and DASD requirements, and the physical and protocol connectivity of your choice.

Lotus specifies a minimum of 32 MB of memory, with 64 MB recommended. I recommend 64 MB since Lotus Notes for AIX performs better with more memory. In addition, Lotus recommends that you add 16 MB of memory for every 64 users. In my experience with users of Lotus Notes for AIX, typical configurations run from 128 MB for smaller systems to 512 MB for extremely large systems.

On AIX, as on other server platforms, Notes performs better with as much DASD as you can afford. The DASD requirement for Lotus Notes for AIX is not significantly different than on other platforms—above the operating system requirements, Lotus Notes for AIX needs 100 MB for the installation or distribution directory, plus 20 MB minimum for the server directory (but, more likely, 300 MB for mail and database files), plus expansion based on how much application data and user mail space you require. If you are going to support a larger number of users, you may end up with a larger DASD configuration than on a non-AIX server; however, since you may also end up with

fewer servers, it may be a wash in terms of DASD cost. Still, you should spread Notes application database files and the Notes code libraries across as many high-speed adapters as possible for optimum capacity and performance.

Lotus Notes for AIX installation and customization uses the AIXwindows environment, so you will need a graphical workstation for the Notes server. Usually this is the high-function terminal (HFT) used for the system console, but it can be an Xstation if you prefer. Check the Notes documentation for detailed requirements.

Lotus Notes for AIX comes on an industry-standard CD-ROM, which may be exchanged for an 8 mm tape upon request. Of course, installation via CD-ROM is slightly faster, but since installation isn't done often, this may be a minor consideration.

Typically, end-user workstations use either Token-Ring or Ethernet connections to communicate with the Notes server in the LAN environment. Older RISC System/6000s come standard with Token-Ring and Ethernet ports; newer ones come standard with Ethernet ports (Token-Ring support can be added). Often, traveling users use asynchronous (TTY) connections and the native Notes X.PC protocol to communicate with the Notes server. All RISC System/6000s come with some TTY ports (additional ports can be added).

For details about configuring the appropriate hardware, contact your IBM representative or your IBM business partner.

### **What Lotus Notes for AIX Isn't**

Instead of being a matter of what Lotus Notes for AIX isn't, it is really more a

matter of what is not yet available with Lotus Notes for AIX.

For example, some communication protocols (e.g., AppleTalk or NetBIOS) may not be supported. As MacTCP's popularity grows, many users choose it over AppleTalk. And, as LANs grow, NetBIOS users often convert to the TCP/IP protocol to avoid the challenges that broadcasts present in an environment with bridges and routers.

Likewise, there may be companion products (e.g., the Notes Fax Server or Lotus Notes Connect for X.25) that are not yet available. You may want to use these companion products on servers that your network outgrew but that still have a useful life as a gateway or Notes companion product server.

Finally, there may be application development or systems management tools available only on a particular platform. For example, you may have used a tool to develop a Notes client application. If you are not going to run that application on the Notes server, then it won't matter that this tool is not yet available, unless you also have AIX (or other UNIX) Notes clients to which the tool does not yet apply.

In general, the marketplace tells Lotus in which order to provide companion products. So, keep those cards and letters coming, or pass on your requirements to your Lotus or IBM representatives and/or business partners. You may also want to pass your requirements through a user group to which you belong, such as WALNUT (Worldwide Association of Lotus Notes Users of Technology), SHARE (which has an active group of Lotus Notes users), or a local or regional Lotus Notes user group.

## Getting Started with Lotus Notes for AIX

Now that you know what Lotus Notes for AIX is and what it isn't, and you've decided to implement an AIX Notes server, what do you do next?

### Planning Your Implementation

Ground rule "zero" is to put together an implementation plan. Even though you know how to use Notes, and you may even have some AIX experience, heed the

words of the poet Robert Burns, "Best-laid plans of mice and men gang aft agley." I recommend you put together a detailed plan and review it with your Lotus and/or IBM representatives or Lotus/IBM business partner(s). Some of the elements you should include in your plan are discussed here. If you have an existing Notes installation, you should go through the same kind of implementation planning that you would for any new Notes server. So, I'll concentrate on the items that are unique to Lotus Notes for AIX.

### Ordering Hardware

If you are not going to use an existing RS/6000, contact your IBM representative or your IBM business partner to order the RISC System/6000 hardware. You will need to specify which version of AIX to order; I always recommend using the latest level of AIX (currently Version 4) because that version works with Notes R4 as well as with Notes R3.x. (In fact, although Notes R3.33 is the first version to certify support for AIX 4.1.2+, previous releases of Lotus Notes for AIX should work OK.) Pay attention to the memory and DASD guidelines discussed previously.

## *If your Notes server is maxed-out, an AIX Notes server may help you . . .*

If you are going to use an existing RS/6000, you will want to do the same planning, but you may not have to order anything other than additional memory and/or DASD and verify that your communications resources (LAN and TTY) are adequate.

### Ordering Software

Order Lotus Notes for AIX through your normal channel. As mentioned previously, it comes on CD-ROM, but you can exchange the CD-ROM for an 8 mm tape if you desire. Be sure to order the documentation as well. The installation process is different from that for OS/2, Windows, or NetWare, so you will need the documentation.

Speaking from personal experience, installing Lotus Notes for AIX is relatively

easy; I have found that novices succeed more often than long-time AIX and UNIX technical staff. My theory is that more experienced people may disagree with some of the suggested steps or believe that some don't matter. On the other hand, my *naive* installations, numbering too many to count, have succeeded by following the directions explicitly in all cases, doing simple PD/PSI (problem determination/problem source identification) when things don't go quite right, and installing all prerequisites, including those that supersede the recommended PTFs.

### Providing Technical Support

If you don't have skilled AIX resources in-house, decide where you'll obtain support. You may want to train an employee, hire someone to do the work, or contract with IBM or an IBM business partner. I recommend having in-house skills, but you may want to use a combination of the above to get started. If you are going to train someone on your staff to support AIX, you should call (800) IBM-TEACH (800-426-8322) to schedule the suggested classes or to order the equivalent computer-based training (CBT) tutorials. Then, see that the training plan is executed appropriately.

Put the appropriate technical support contracts in place. If you already have Notes technical support, this task may be limited to adding AIX support. Since you will need some support on AIX, I recommend that you sign up for a level of IBM's AIX Support Family Services. To find out about the available levels of support and consulting, call (800) CALL-AIX (800-225-5249) in the US. (For other countries, contact your IBM representative.)

One option I strongly urge you to explore is called TECHLIB. TECHLIB is a compilation of various hints and tips, questions and answers, and maintenance information compiled by IBM's AIX Systems Center in Roanoke, Texas. I have found this information invaluable in various Lotus Notes for AIX situations.

### Installing

Finally, you should install or upgrade your hardware. Ensure that AIX is at the proper level, including prerequisite PTFs (see my previous comments), and contact your support resources to ensure that you understand the latest details about installing Lotus Notes for AIX.

Do the installation. Test it. Begin co-existence with other servers. Begin migrating users to the new server. And be sure to document what you do along the way, in case you want to save time on the next AIX Notes server you install. This will make system management much easier for your support staff, which in turn makes them more responsive to your users.

## Expanding Your Horizons

In this article, I have tried to convey the following key points:

- Lotus Notes for AIX is "just" Lotus Notes.
- If your Notes server is maxed-out, an AIX Notes server may help you by supporting more users per server than other platforms.
- There are some minor caveats, mostly in terms of companion products (usually gateways or application development tools that may not be supported on all clients or on AIX servers).
- There are a variety of RISC System/6000 models, including uniprocessors, SMP-based models, and the unique Scalable POWERparallel system, all of which can support Lotus Notes for AIX (except that SMP support on AIX is available only beginning with Notes R4).
- AIX is an excellent implementation of UNIX, with the appropriate capacity and performance characteristics and

system management tools needed as a Notes server environment.

- With appropriate planning, configuration, education, and support in place, you should be successful in implementing Lotus Notes for AIX servers in a PC environment.

If you meet the guidelines discussed above, an AIX Notes server may be appropriate in your Notes network.

While this article has not touched on the more sophisticated aspects of the AIX world (e.g., HACMP or RAID configurations, either of which could constitute an entire article), I hope this overview of the RISC System/6000 and AIX has been useful in expanding your horizons about potential solutions to challenges you face in the capacity/performance arena.

## Acknowledgments

I thank Bob Mulholland and Bucky Pope of IBM's RISC System/6000 Division, Bob Minns of IBM's Solution Developer Operations, the staff of IBM's Lotus Notes Competency Center, and the staffs of IBM's AIX Systems Center and IBM's Personal Systems Competency Center for their support and patience during my multi-year learning curve. This article would not have been possible without their kind assistance and many spirited discussions. Ed Newberry of IBM's Lotus Brand Management team in Austin, Texas,

provided thoughtful insight and some useful graphics for this article; his help is greatly appreciated. Some of the motivation for this material was inspired by Joyce Keith of Lotus Development Corporation, for which I am grateful. Finally, I am most grateful for the thoughtful Lotus Notes instruction from my wife—she is both gentle and thorough in ensuring that I don't miss some detail that means the difference in success and failure.



**Rufus Woody III** is a slightly irreverent, but honest-to-a-fault, consulting market support representative in IBM's Lotus Notes Competency Center, which is part of the Personal Systems Competency Center in Roanoke, Texas. He specializes in the AIX version of Lotus Notes and has supported other AIX-based client/server offerings in the PC environment. He also teaches two workshops—

*Lotus Notes for AIX* and *AIX for Lotus Notes*. Rufus has supported IBM office systems on mainframes, minicomputers, and PCs for more than 15 years. He is married to an IBMer who also supports Lotus Notes. Outside of the work environment, Rufus enjoys giving sushi-eating lessons to novices, and his conversion rate is extremely high. Rufus can be reached electronically via Notes at [Rufus.Woody@Lonestar@Notes.Net](mailto:Rufus.Woody@Lonestar@Notes.Net); via Internet at [aixofc@vnet.ibm.com](mailto:aixofc@vnet.ibm.com); and via IBMMAIL at user id USIB59NF.

# New Administrative Features and Enhancements in Lotus Notes Release 4

*Would you like to spend less time running your Lotus Notes servers and keeping your end users happy and content? Lotus Notes Release 4 can help you do just that! It has many powerful tools to ease the deployment of Notes and help you manage administrative tasks quickly and easily through automation. This article introduces some of the many new features and enhancements in Lotus Notes Release 4 that make Notes administration easier.*

*This article is based on early beta builds of Lotus Notes Release 4. The conclusions in this article are drawn from hands-on tests and early beta documentation. It is possible that actual product functions described here may change or may not be included in the final product. Screen captures may also vary from the screens you will see in Lotus Notes Release 4.*

---

Louise Young  
IBM Corporation  
Roanoke, Texas

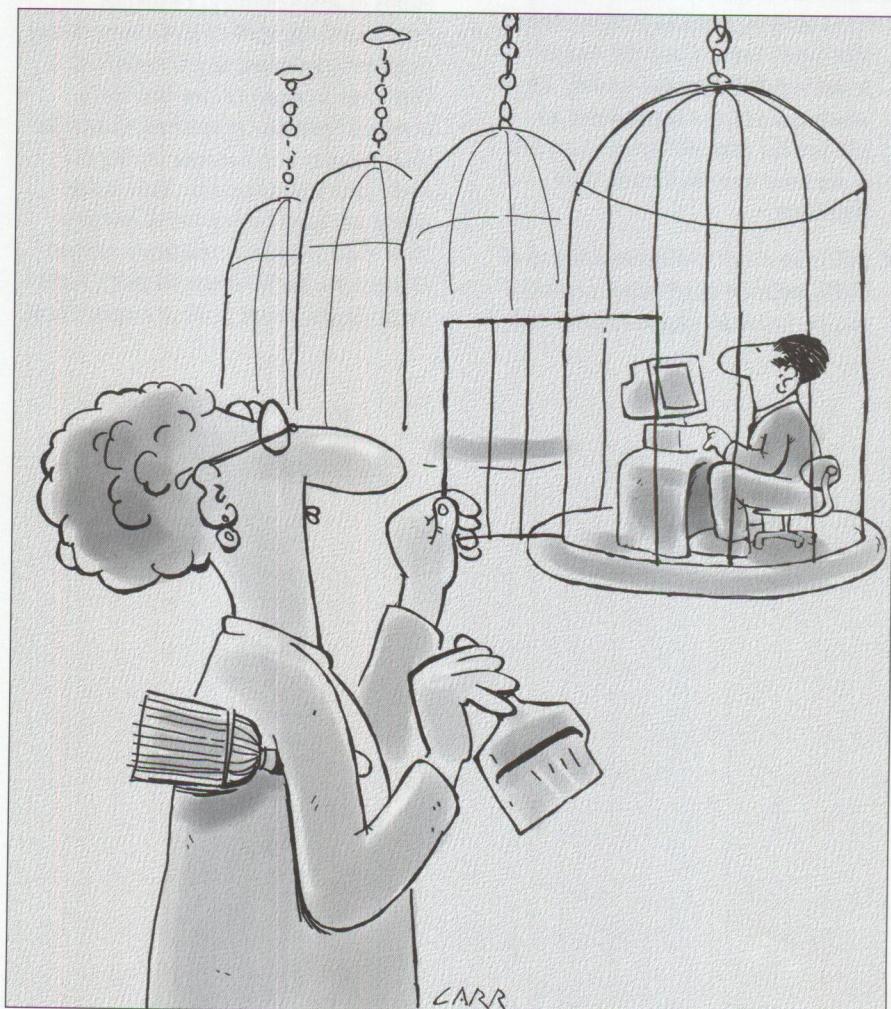
---

**L**et's take a look at several capabilities of Lotus Notes Release 4:

- The Name and Address Book
- Administrative Control Panel
- Multiple passwords on Certifier IDs
- Single Copy Object Store
- Database size limits and database security

## The Name and Address Book

The Lotus Notes Name and Address Book (NAB), one of the most important databases in a Notes domain, plays many roles. It is a directory service for mail routing and provides the names of users, groups, servers, and certifiers. As a server management tool, it provides information



about scheduling replication and mail routing, runs programs automatically, and provides instructions for initiating statistics and alarm reporting performed on a server. Keeping the NAB running smoothly is critical to maintaining a well managed, well run Notes domain.

### Managing User Names in the NAB

A *user document* identifies a Notes user in a domain, as well as defines the home server for each user. (The home server is where the user's mail file is stored.)

User name and group management is easier in Release 4. Now you can accomplish tedious tasks such as deleting a name from the NAB and all instances of that name in additional groups in the NAB by simply deleting the user document.

Once selected, the action to delete the user document from the NAB takes place immediately, affecting all references to this person in all groups in the NAB. What does this mean to server administrators? You are no longer forced to manually look through multiple group documents to find and delete user names.

*Admin Proxy Agents*, a new feature in Release 4, updates a domain's NAB and Access Control Lists (ACLs). In other words, administrative agents clean up and reconcile all the Name and Address Book documents and ACLs after a user or server is renamed, recertified, or deleted.

Administrative agents relieve you from having to change the Name and Address Book and database ACLs manually. You no longer must seek out each occurrence of a user or server, because the agent conducts the search and makes the change.

Examples of Admin Proxy Agents activities are:

- Delete user
- Rename in ACL
- Copy server's public key
- Rename user in the NAB
- Rename server in the NAB
- Move user in hierarchy

### Managing Group Documents in the NAB

*Group documents* (also called *groups*) list users, groups, servers, and combinations thereof. They are useful for mailing lists,

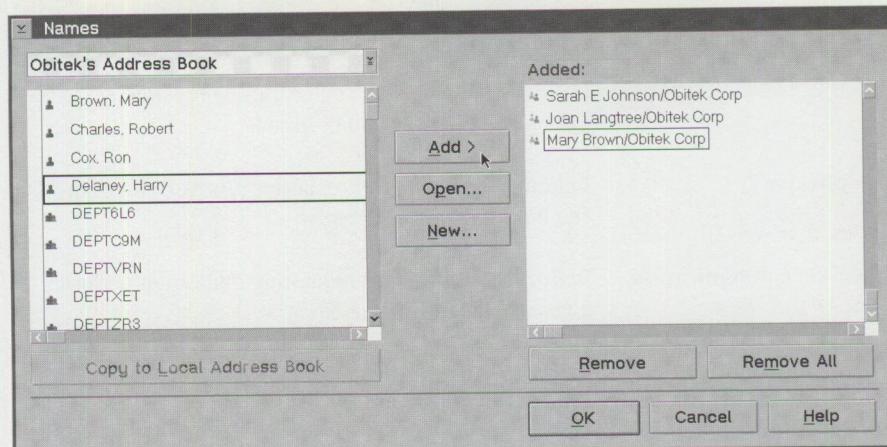


Figure 1. New NAB Interface for Creating Group Documents

ACLs in databases, deny access lists, and server access lists.

You'll find it easier to create and manage groups by creating specific group types by category using the following keyword list choices:

- Multi-Purpose—Can be used as a distribution list for mail, in an ACL, or in appropriate locations in a server document (Groups migrated from Release 3 will be multi-purpose.)
- Access Control List Only—for ACL only; can't be used as a distribution list for mail
- Mail Only—for mail only; can't be used to manage an ACL
- Deny List Only—Used in the restrictions portion of a server document

Use the multi-purpose type for the majority of groups. When you know that you will use a group for a specific purpose, use one of the other choices.

In Release 4, you can easily add users to a new or existing group by highlighting and selecting names from the NAB's Names view. Figure 1 shows an example of the new interface for working with group documents in the Name and Address Book.

If a name is not listed in the Names view, you can manually type the name. You can delete individual names one at a time by selecting the Remove button or remove the entire list via the Remove All button.

### Server Documents

*Server documents* define information about an individual server in the Notes

domain. A server document is required for each server in a domain.

Because server documents are quite large, Release 4 divides them into collapsible sections for easier viewing and browsing. Document sections and short descriptions are listed below:

- Basics—Contains server name, domain name, cluster name, administrators, and routing type
- Server Location Information—Used in setup of remote user documents, e.g., hotel, home, office
- Network Configuration—Defines enabled port names and addresses
- Security—Defines public key comparisons during authentication; allows anonymous access
- Restrictions—Defines who can and can't access the server, who can create databases, who can make replicas, and who can use a server as a passthru server
- Agent Manager—Defines who can run private agents, restricted and unrestricted LotusScript agents, and daytime and nighttime parameters
- Contact—Optional fields for server location, department, and description

### Connection Documents

*Connection documents* provide server, domain, and task information for connecting servers to each other for mail routing and replication. Release 4 allows you to create dynamic connection documents based on connection requirement types. Options are:

| INI Setting                  | Description  |
|------------------------------|--|
| <b>RouterUsesObjectStore</b> | Defines whether server router uses object store. Values are 1=Enable and 0=Disable.  |
| <b>Replicators</b>           | Indicates the number of replicator processes that can run on a server concurrently.  |
| <b>ServerPushReplication</b> | Defines whether server requesting replication performs a Push. Values are Yes or No. |
| <b>Log_Replication</b>       | Determines if Notes log records replication events. Values are Yes or No.            |
| <b>AdminPInterval</b>        | Specifies the interval when the Admin Proxy Agent runs.                              |

Figure 2. Server Configuration Document Variables

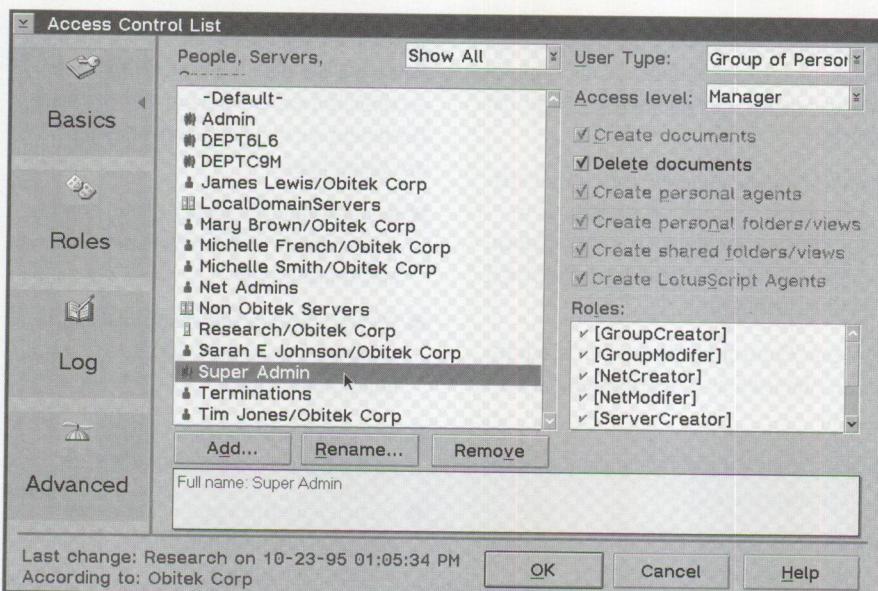


Figure 3. New Access Control List Interface

- Dialup modem
- Local area network
- Passthru server
- X.400
- Remote LAN service
- Simple Mail Transfer Protocol (SMTP)
- X.25
- cc:Mail

If you select the connection type as dialup modem, the document displays fields that are pertinent to a dial connection—e.g., destination phone number, login script file name, and login script arguments. If you select the connection type as local

area network, the information that is unique to a dial connection is replaced by fields for a LAN connection (for example, an optional network address such as 9.19.140.89).

There are instances when you may want to connect two servers that are running different network protocols. In these instances, you can't use network connection documents to directly connect the two servers. Instead, you must use an intermediate server that has both protocols configured on it as a passthru server. A passthru server becomes the intermediate server, routing information between the two servers running different protocols. Passthru servers are defined in a connection document.

Several new fields have been added in the routing and replication section of a connection document. You can specify four different replication types: pull-pull, pull-push, pull only, and push only.

You can include a list of files to replicate in a specific order. All databases with the same replica ID will replicate if nothing is specified in the Files to Replicate field.

There is also a field to set the maximum allowable time for a replication cycle. When the replicator reaches the limit, replication ends, even if all databases have not been replicated and the replication cycle isn't complete. This option helps keep servers on their correct replication schedules.

### Server Configuration Documents

*Server configuration documents*, new in Release 4, are used to set NOTES.INI variables without editing the physical file. Changes made to a server configuration document are written to the NOTES.INI file.

The server periodically reads the server configuration documents and updates NOTES.INI settings. Settings in the NOTES.INI file are overwritten by settings configured in the server configuration documents, and server configuration documents take precedence over settings configured with SET CONFIG commands issued at the server console or remote server console.

You can set the scope of NOTES.INI settings for all servers in a domain, a group of servers, or a single server. You can use an asterisk (\*) in the server name field to indicate all servers in a domain, or you can specify a group or individual server. A parameter indicates the last person who made a change and the time the change was made, making it a useful audit-trail tool.

A server configuration document displays only settings previously entered in the server configuration document. It cannot display settings added to the NOTES.INI file during server installation and setup.

Figure 2 lists a few of the NOTES.INI variables you can set in server configuration documents.

## Access Control List Management

Managing ACLs can be the bane of a server administrator, because you spend countless hours trying to maintain, manage, and control them, only to find that one seemingly innocent change made to an ACL can have disastrous effects throughout entire domains.

Release 4 includes several utilities to ease ACL management. Figure 3 illustrates one of these utilities, the Access Control List interface.

In the ACL control panel, you can:

- List names in the ACL by access level
- Classify names in the ACL by type for additional security (unspecified, person, group, group of servers, group of users)
- See a history of ACL changes—who made the changes and the date and time when changes were made
- Authorize names listed in the ACL to create personal agents, personal folders/views, and LotusScript agents.

## Administrative Control Panel

Administration tasks become much easier with a new feature in Release 4 called the *Administrative Control Panel*. This panel (shown in Figure 4) provides “one-stop shopping” for virtually all server administrator tasks, including pushbutton access to maintaining users, groups, and servers in the NAB.

In addition, from the Administrative Control Panel, you can access other functions and utilities, including:

- Working with certifiers (creating, cross-certifying ID files, viewing the certification log, and registering certifiers)
- Monitoring MAIL.BOX and sending a mail trace to locate and debug mail routing problems
- Using the remote server console
- Monitoring administrative databases such as the Notes Log, Catalog, and Statistics; doing statistics and database analysis; compacting databases; creating and maintaining full-text indexing; setting database quotas

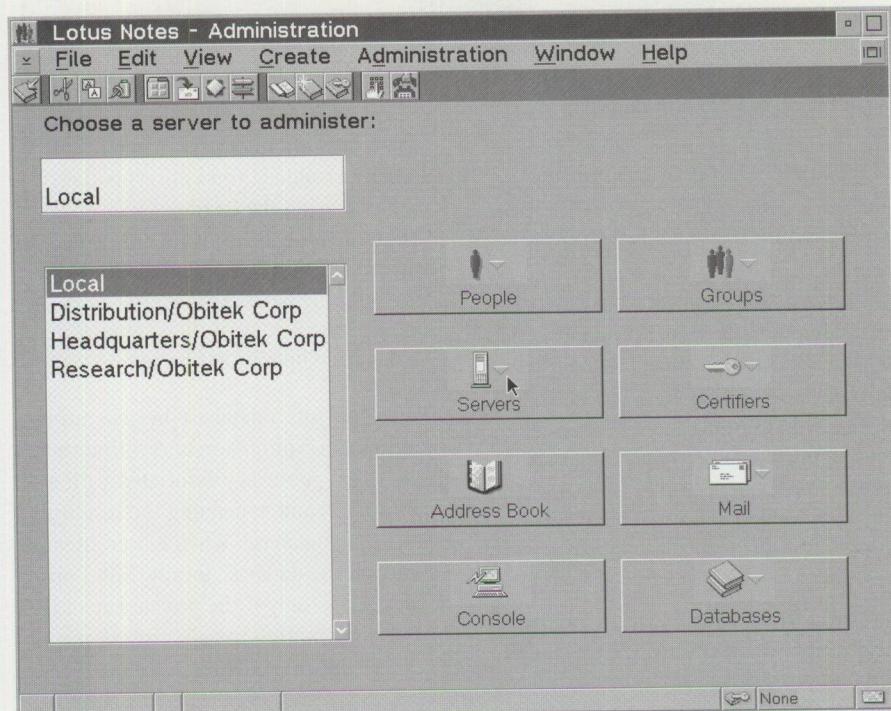


Figure 4. Administrative Control Panel

## Multiple Passwords on Certifier IDs

You can add multiple passwords to hierarchical certifier IDs to protect them from fraudulent use by requiring more than one person to enter a password. This feature enables you to create a list of authorized users who can use the certifier, as well as choose the number of passwords required to access the ID. Each user in the authorized list creates a password on the certifier ID that is not known to the other users in the list.

For example, if there are four names in the authorized list and the number of passwords required is two, then any two in the authorized list must be available to create or recertify IDs. If a user in the authorized list leaves the company or changes jobs and should no longer have certifier access, you can remove that name from the authorized list and add another name. This feature helps maintain certifier security.

Also, in Release 4, if someone fraudulently accesses a certifier and enters an incorrect password, the time delay experienced in the return of the “wrong password” dialog box increases each time the wrong password is entered. This time delay is meant to discourage hackers from trying

to guess at passwords associated with the certifier.

## Single Copy Object Store

*Single Copy Object Store* (SCOS) is a space-saving facility allowing storage of a single copy of a mail message sent to multiple users in a special-purpose object store database called MAILOBJ.NSF.

You can configure and enable SCOS in a server configuration document in the NAB. Individual mail databases are manually linked, one at a time, to MAILOBJ.NSF from the server console. Once SCOS is enabled on a server, and mail is sent to two or more people whose mail files are linked to MAILOBJ.NSF, the router separates the message header text from the body of the mail message, sends the header text to the individual mail file, and sends the content to MAILOBJ.NSF. The body text is stored only once, in MAILOBJ.NSF, thus lessening the system burden and saving disk space.

End users are unaware of the fact that there are links between the message content and the header text. They read their mail as if it were stored in their individual mail file.

What happens if a user edits and saves a mail message? The body content is moved

to the user's individual mail file, and the pointer to MAILOBJ.NSF is deleted. If a user deletes a mail message, only the pointer is deleted from his or her mail file; the body content still resides in MAILOBJ.NSF. Mail that has been encrypted is not stored in MAILOBJ.NSF, but instead in individual mail files.

To keep the size of object store databases to a minimum, the server program Collect deletes obsolete documents that no longer have pointers associated to the body content because all users have deleted the mail message (the pointer). The Collect server program, by default, runs at 2:00 a.m. on all object store databases on a server.

### Database Limit

*Database limit* represents the maximum size that a database can occupy on a hard disk. Database size in Release 3 is limited to 1 GB. The limit in Release 4 has been increased to 4 GB. When you create a new database, you can choose an option to set the database size up to 4 GB. Once the database size is created, the size cannot be changed.

Being able to establish a maximum database size allows server administrators or database managers to plan for server space and to manage and control database size. In addition, tools are available to help you monitor database size and to set database quotas and warning thresholds.

### Local Database Security

You can add *local database security*, sometimes referred to as *local database encryption*, to a database to prevent unauthorized local access. When local security is added, Notes encrypts the database using the ID file of the server or user that stores the database, thus preventing someone with another ID from accessing the database from the workstation or from a copy of the database made through the operating system.

Notes encrypts a database by generating a random encryption key, encrypting this key with a public key associated with a selected ID, and appending the resulting key to the database. When a user attempts to access the database locally, Notes provides access only if the private key of the person attempting to gain access can decrypt the appended key.

### Much More to Explore

There is so much to explore in Release 4; this article covers only the "tip of the iceberg." The list of new features goes on and on. Here are just a few more to whet your appetite:

- Field replication instead of document replication
- Faster algorithm replication and support for multiple replicators
- Passthru server for remote access—the user connects to multiple servers with a single phone call

■ Less time to start a Notes server—the consistency check on databases is performed at the same time as server initialization

■ Improved message tracing tools to manage message routing

■ New views in the Notes Log (LOG.NSF) for mail routing events and phone calls by date and by user

■ Tools for hierarchical ID conversion and ID recertification

■ Redesigned Notes mail template

■ Retrieve key on the server console

■ Stacked replicas on the work page

■ Additional tabs dynamically added to the work page



**Louise Young** is an advisory marketing support representative in the IBM Personal Systems Competency Center in Roanoke, Texas, specializing in support and services

for Lotus Notes, with emphasis on server administration duties. Louise joined IBM in 1981 and has provided technical support and instruction for IBM products including DOSF (8100), Displaywriter, DisplayWrite, and OfficeVision. She can be reached via Internet at lky@vnet.ibm.com.

# MQSeries link for Lotus Notes

***IBM MQSeries link for Lotus Notes is a new function of IBM's MQSeries product. It connects Lotus Notes applications with new or existing applications on any of 18 software platforms. This article describes the need for this function, gives a detailed sample application, and explains its inner workings.***

**T**oday's business environment encompasses a variety of computing power and connectivity requirements. Many companies have a significant investment in mainframe systems that have cost millions of dollars to develop and maintain. They consider the investment they have made in these legacy systems to be just as valuable as the corporate data the systems hold. Legacy systems have such tremendous value because the information they contain is the combination of data held in a repository and the business rules of the enterprise. Today, enterprises want to recoup as much as possible of their investment in legacy systems.

While recognizing the value of their mainframe systems, companies also want to leverage the power of the workstation when developing new applications. Desktop systems are available, at a low cost, to all information workers in most enterprises. Applications such as databases, word processors, and spreadsheets are tremendous productivity tools. Laptop computers improve workers' productivity considerably. Corporations have made a significant investment in workstations and want to recoup as much of that investment as possible.

---

**Wayne Schutz**  
IBM Corporation  
Sterling Forest, New York

---

Companies today are also investing in mobile work forces. Workers are not dependent upon a connection to enterprise servers. As more employees work out of virtual offices, the requirements for a mobile work force become more important. While this work force periodically disconnects from the enterprise server, they must retain the ability to upload and download business transactions. In

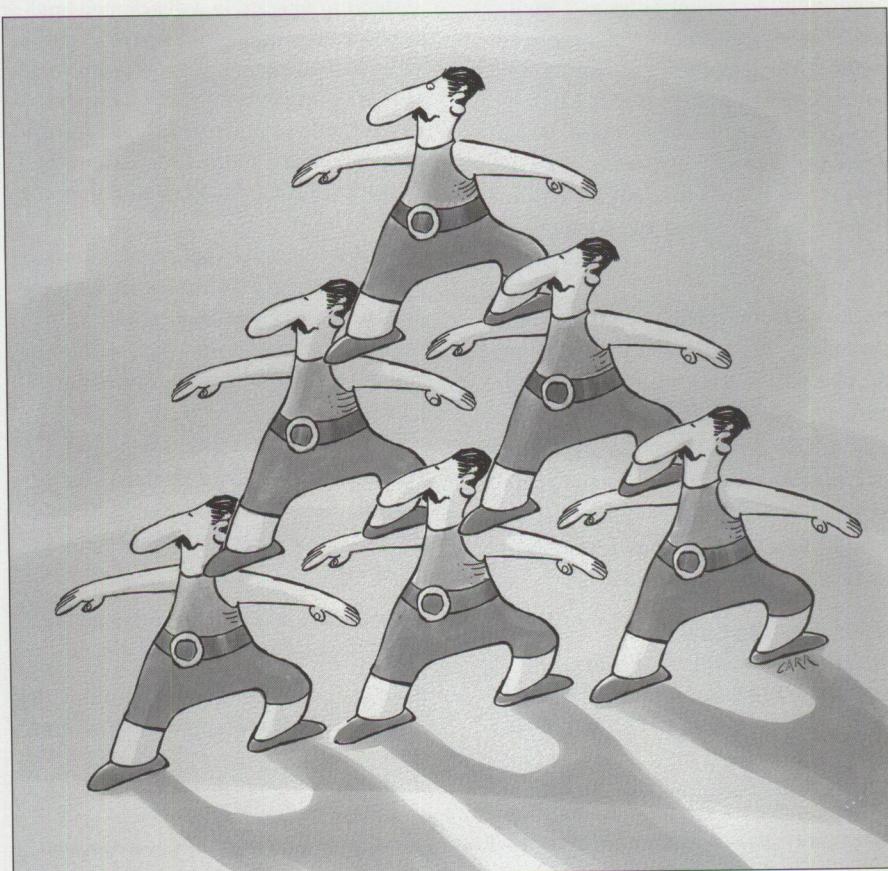
addition to communicating with the enterprise server, the mobile worker must also maintain communication with peers, in a workgroup fashion.

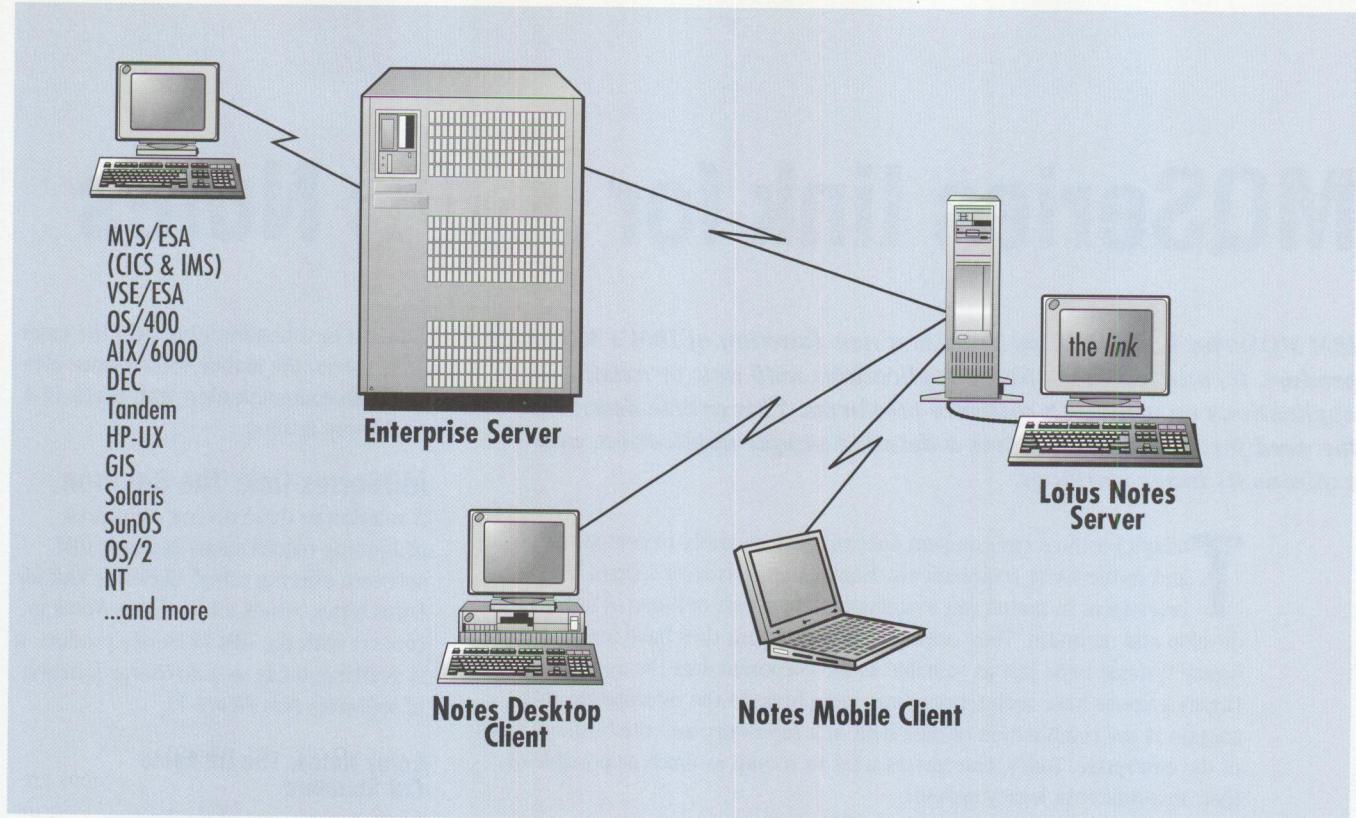
## MQSeries link: The Solution

A solution to these diverse enterprise computing requirements is a new IBM software offering called MQSeries link for Lotus Notes, which allows Lotus Notes to connect with the IBM MQSeries product. It is available today as a no-charge function of MQSeries (see Figure 1).

## Lotus Notes: The De Facto C/S Standard

Lotus Notes is one of the leading client/server systems today. Notes is an environment for the development and deployment of groupware applications. While these groupware applications are





**Figure 1. MQSeries link Overview**

designed to manage unstructured data, many organizations have identified the opportunity to exploit Notes as a front end to host-based transaction processing systems. This provides users with a single point of access to these systems and to client/server applications. It also enables developers to build applications that use both the structured data of transaction systems and the unstructured data of groupware.

For many users, Notes has become the computing "home" in which they spend the majority of their time. Notes' groupware applications, client/server mail, integration with desktop productivity tools, and integration with third-party databases make it a robust, familiar environment in which to launch and run a wide array of business applications.<sup>1</sup>

#### **MQSeries: The Link**

MQSeries, announced by IBM in September 1992, is a strategic element of the IBM Open Blueprint. The IBM Open

Blueprint is a framework that describes the components necessary for business systems to operate in a distributed environment. The framework describes services such as communication technologies that are prevalent in today's industry (e.g., remote procedure call) and describes how they relate to other services in the Blueprint, such as transaction processing.

MQSeries is a set of application interfaces and supporting software for 18 software platforms. It enables applications to communicate with each other easily and dependably across many diverse platforms.

The MQSeries family of products has gained strong and enthusiastic customer acceptance through its many benefits, including:

- A common application programming interface across multiple platforms.
- Assured message delivery, meaning that once MQSeries accepts a message for

delivery, it guarantees that the message will be delivered to the target platform only once.

- Time independence, meaning that neither the receiver of a message nor the path to the receiver must be active at the time a message is created for delivery.
- A robust set of services, which includes logical units of work support, backup and recovery, large messages, and high performance.

The link provides connectivity from Lotus Notes to an enterprise server. This means that Lotus Notes users will be able to access both data and transactions on an enterprise server, which may reside on any of the platforms currently supported by MQSeries. (In this article, the terms *enterprise server*, *host transactions*, or *transaction systems* mean any existing applications running on the platforms supported by MQSeries. So, for example, CICS, IMS, AIX, HP, Solaris, GIS, NT, Digital Equipment, OS/2, Tandem, and others are platforms where links communicate.)

The technology removes the constraints of partial solutions, providing an

<sup>1</sup>These sections are excerpts from a white paper by Barry Lotman, Lotus Development Corp., titled Notes and Transaction Systems: MQSeries and CICS link to Lotus Notes, copyright Lotus Development Corporation, October 1995.

organization with a robust, transaction-oriented solution for integrating legacy systems with Notes. The link leverages existing transaction-processing systems, requiring no changes in technology or business processes to conduct backup and recovery, logging and auditing, system measurement, workload balancing, or performance monitoring. System security also remains unchanged. In addition, the link allows Notes to act as a common front end to a variety of otherwise stand-alone and incompatible systems. Also, the integration between transaction systems and Notes includes support for mobile and remote Notes users.

To take advantage of the function that MQSeries link provides, the systems administrator and Notes application programmer must make small changes, such as adding the mailsend macro to the Notes application. Once these changes have been made, however, the end user of the Notes application can seamlessly access server transactions from Notes. This means that, for example, the Notes application programmer can set up a button on the Notes form to make a call from Notes to an enterprise server transaction,

such as CICS running on MVS. To access the host resources, the end user simply presses this button. Other methods, such as Notes hourly macros, which can invoke the MQSeries link function, do not require human action.

### Sample Application

Let's use the sample application in Figure 2 to demonstrate the link's capabilities.

In this order-entry application, an operator takes the customer's phone order, then enters the customer number, catalog number of the item the customer wants to order, quantity, and desired ship date into a Notes document.

The system uses Lotus Notes to capture the order into a document, then passes the document to an order analyst who determines whether the customer is making a reasonable order and has sufficient credit to cover the order.

If there is insufficient credit, the document is passed to a credit officer who calls a credit bureau to determine whether credit should be extended. If the credit is approved, the order is returned

to the order analyst, who then releases the order.

Once the order is released, a ship date is assigned based on the customer's request. If the requested ship date cannot be met, the order analyst advises the customer of the new ship date. The order is then confirmed and shipped.

### The Current Implementation

This application uses Lotus Notes for its workflow capabilities. The order, after being entered by the order-taker, must pass through the order analyst, possibly the credit officer, then return to the order analyst. During the various phases of this order process, Notes is used to print copies of the order. These copies are then used to enter host transactions or to call the credit bureau.

The CICS-based transactions are used to price and book the order, get the customer's credit line, release the order, and assign a ship date. These transactions are done by printing the order and typing the information into a CICS screen.

This method is inefficient and error-prone, because information must be

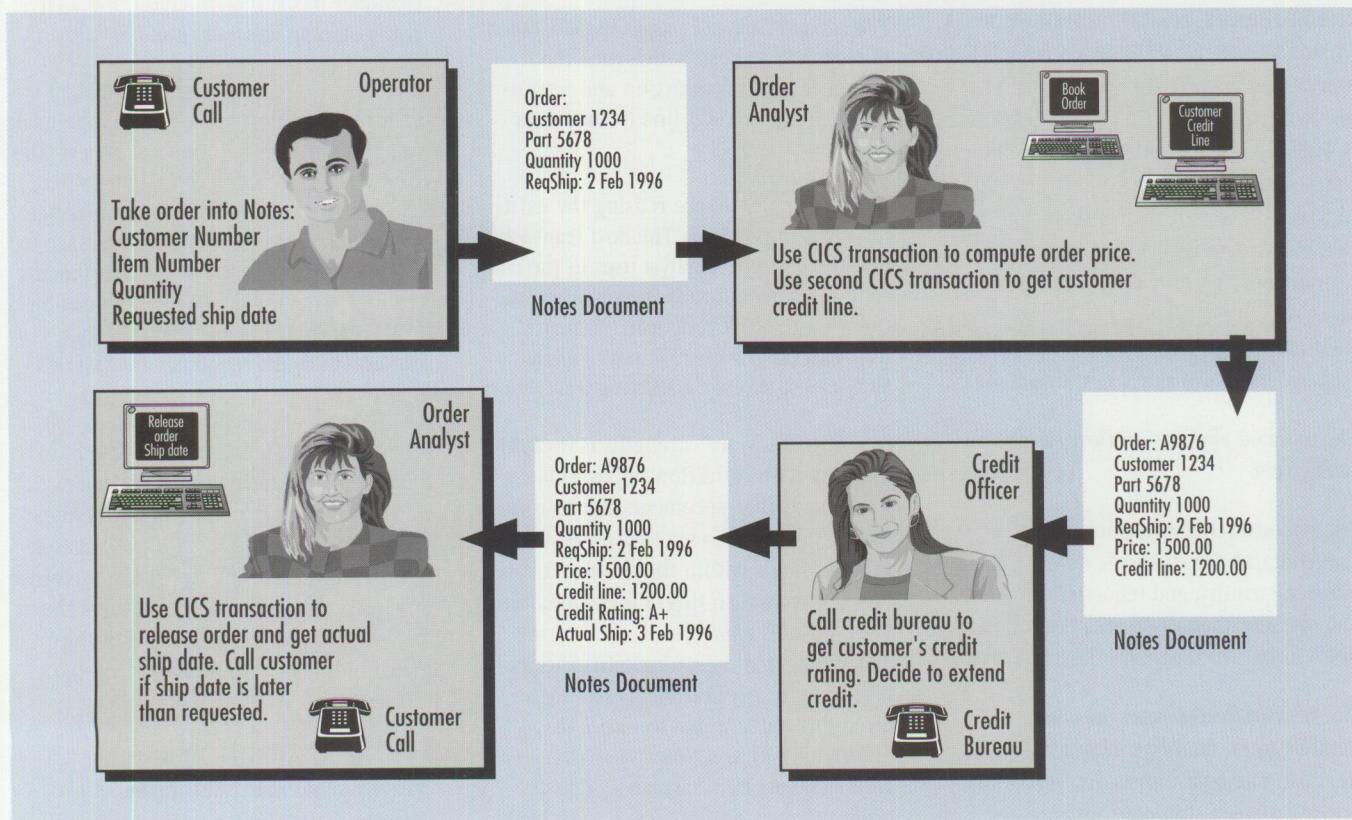
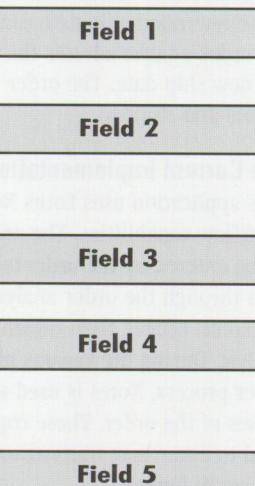


Figure 2. Sample Order-Entry Application

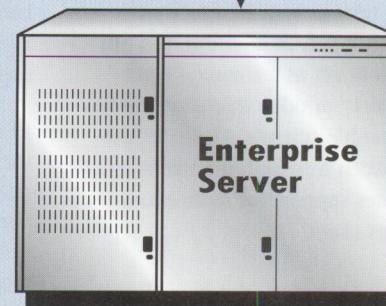
## Lotus Notes document



**MQSeries  
link for  
Lotus  
Notes**

## MQSeries message

Field 1      Field 2      Field 3



**MQSeries message**

Figure 3. Information Flow from Lotus Notes to MQSeries

printed and typed into CICS screens, then the results must be typed back into Notes.

### The MQSeries link Implementation

An analysis of this application reveals four places that the link product can be used effectively. The link works (as shown in Figure 3) by first taking fields from a Notes document, formatting those fields into an MQSeries message, then sending that message to a host that executes a transaction. Next, the transaction sends an MQSeries message to the link. Finally, the link places the information from the message back into the Notes document.

The updated application flows as shown in Figure 4.

The operator creates a Notes document that contains the customer number, item number, quantity, and requested ship date. The operator then clicks on a button on the Notes form, which invokes the link twice.

The first link call passes the customer number, item number, and quantity to the host. The host transaction prices the order, assigns a ship date, and creates an order number. That information is

returned to the link code, which updates the document with that information.

The second link call passes the customer number to the host, which runs the customer credit transaction and returns the customer's credit line to the Notes document.

In this sample, we are reusing the existing host transactions. The host transaction that the customer analyst uses in the current implementation is the same transaction that the link code uses. A small front-end program is required to allow MQSeries to access the existing transaction.

One of Lotus Notes' strengths is its ability to easily write workflow applications. This means that documents can be routed from one person to another based on the value of fields within the document. One way to accomplish this is by using a Notes view. A Notes *view* allows users to see documents that meet a certain criterion—for example, any documents having a given due date. In our scenario, the order analyst has a Notes view that shows all documents that have an assigned order number but not a credit approval number. When the order analyst opens

the document using that view, he or she sees all orders requiring action. If the customer has sufficient credit, the analyst will assign an approval number.

However, if the customer's credit limit is exceeded, the document can then be made to appear in the credit officer's view. The credit officer can click on a button that invokes the link code to send a message to the host, in turn sending a message to the credit bureau to check the customer's credit. (*Note:* The credit bureau must be MQSeries-enabled, meaning that they can accept credit requests via MQSeries messages.)

When the customer's credit rating has been returned to the Notes document, the credit officer reviews it and decides whether to extend credit. The document then becomes available again in the order analyst's view. The analyst releases the order. The CICS system assigns a ship date, and the link code posts it to the document.

### Time Independence

This example illustrates the benefits of MQSeries' time-independent nature. What does this mean?

Suppose that when the operator is taking orders, the back-end system is down. When the operator clicks on the button to price the order, the link places a message into an MQSeries queue. (A *queue* is a safe holding place for messages until they can be delivered.) In this case, the message requesting the pricing information remains on the Lotus Notes server until the host system comes back up.

When that happens, MQSeries automatically sends the message to the host, causing the transaction to run. Now, the host transaction prepares a reply message and attempts to return it to the Lotus Notes server. If the Lotus Notes server is down, MQSeries automatically holds the message in a queue until it can deliver the message to the Lotus Notes server. In this way, work can proceed even if not all the system components (the host and the Lotus Notes server) are concurrently operational.

## How MQSeries link Really Works

Figure 5 shows the workings of the link, including the major Lotus components, the Lotus Notes client, and the Lotus Notes Server. The client is running a

Notes application, which is also referred to as a Notes database. The database contains various documents that are equivalent to the records in a file.

To use the link code, the Notes programmer sets up the client code to complete the fields in the Notes document, saves that document to the Notes server, then issues a *mailsend* command to start the link program. Typically, the saved document contains the information required for the enterprise server. The document may also contain other fields not necessary to the enterprise server but that remain a part of the Notes application.

When the server receives the mail from the *mailsend* command (into the mail-in database shown in Figure 5), it passes that mail to the link task. The link task then reads the mail and uses an entry in the mapping database to build the request to be sent to the enterprise server. The request is passed to the enterprise server using MQSeries, and the Notes mail document is deleted from the mail database.

MQSeries' *triggering* feature allows MQSeries to start a program or transaction

when a message arrives in a queue. This means that host programs or transactions do not always need to be running, waiting for work. MQSeries can automatically start those programs when there is work (a message) for them to do, thus saving system resources.

Programs can be triggered by MQSeries; always running, processing messages as they arrive; or scheduled to run on a periodic basis (hourly, daily, weekly, etc.).

The link can also be set up to receive a reply message from the enterprise server. This reply message might contain an acknowledgment of a successful transaction, a failure indicator, or results from a query-type transaction. (In fact, the reply message can be anything the customer wants it to be.) When the link receives this reply message, it re-reads the mapping database to discover how to take the information in the reply message and apply it to the Notes document (the application database shown in the document).

For example, suppose you want to do a simple credit-line inquiry using the link.

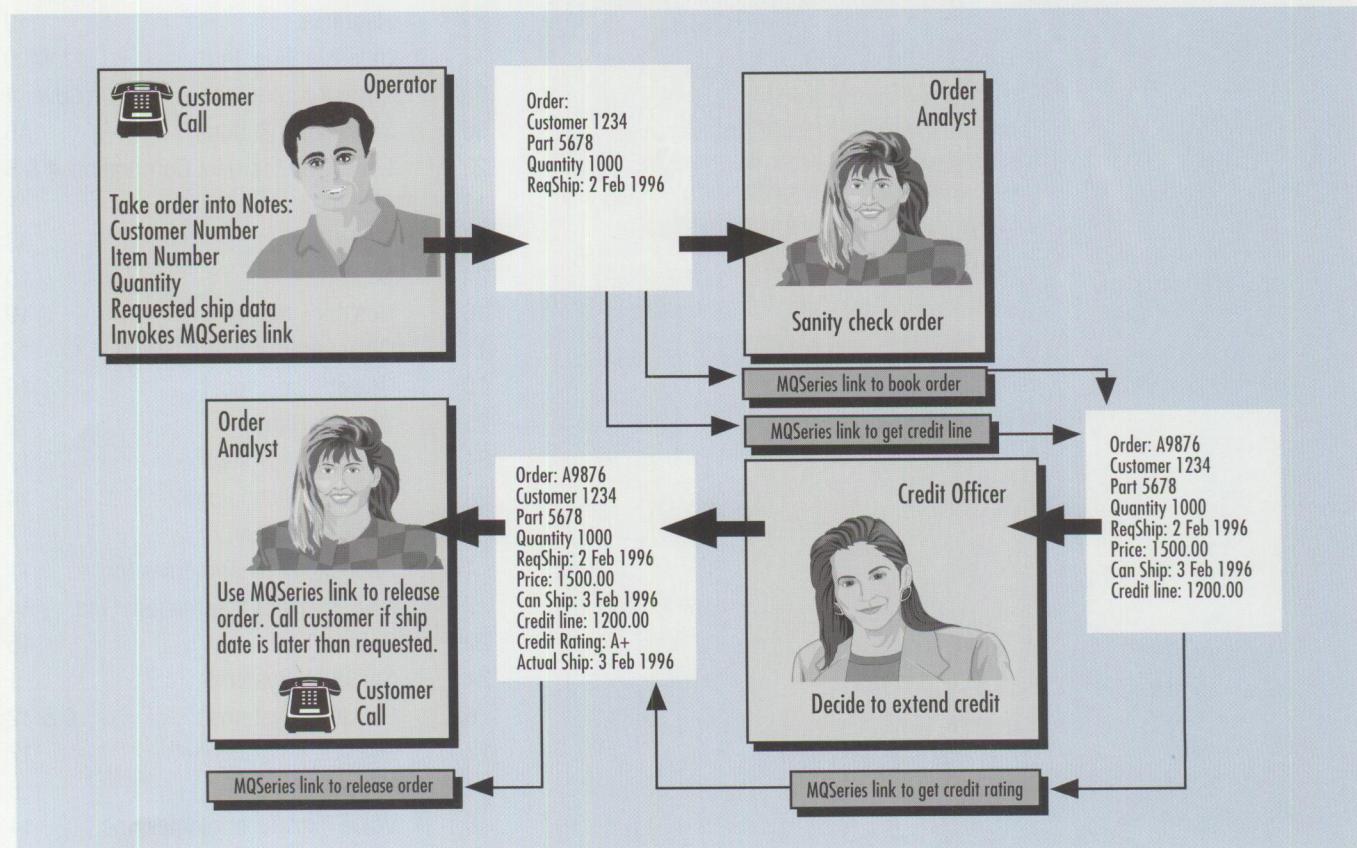


Figure 4. Order Entry System Using MQSeries link

# Personal Systems

# FREE Product Information Index



# STOP!

**Have you used  
the reader service  
card to request  
fast, free  
information  
about the products  
and services  
advertised in  
*Personal Systems*?**

**NO?**

**Caution.** With the heavy traffic of new technology to choose from in the personal computer market, you need to know about all the most recent developments.

**1.** Use the advertiser's index to get the reader service numbers of the products and services for which you want to receive literature.

**2.** Circle the same numbers on the reader service card and fill out the necessary information.

**3.** Drop it in the mail (at no charge!), and we'll give your request the green light!

**YES.**  
Smart move.

| Reader Service Number | Company                         | Page #  |
|-----------------------|---------------------------------|---------|
| 33                    | Arcada Software                 | 21 & 26 |
| 15                    | BBN Planet Corp.                | 18      |
| 19                    | Best Power                      | 20      |
| 2                     | Brainstorm Technologies, Inc.   | 8       |
| 18                    | Bustronic Corporation           | 20      |
| 22                    | ChipChat Technology Group       | 3       |
| 5                     | Cirrus Technology               | 10 & 11 |
| 9                     | CleverSoft                      | 16      |
| 3                     | CompLink Ltd.                   | 8       |
| 34                    | DFI                             | 25      |
| 20                    | Engineered Data Products        | Cover 2 |
| 32                    | Hilgraeve                       | 19      |
| 17                    | Indelible Blue, Inc.            | 11 & 20 |
| 35                    | Infrastructure Inc.             | Cover 4 |
| 30                    | John Wiley & Sons               | 16      |
| 23                    | Lotus Development Corporation   | 4 & 5   |
| 13                    | Map'n'Go                        | 18      |
| 27                    | MicroRim                        | 13      |
| 24                    | Microway                        | 10      |
| 16                    | NetOffice Inc.                  | 19      |
| 11                    | Object Management Group         | 17      |
| 10                    | ObjectSpace, Inc.               | 16      |
| 25                    | On-Line Date                    | 12      |
| 31                    | Percussion Software             | 17      |
| 28                    | Pinnacle Technology             | 14      |
| 26                    | Piper Research                  | 12      |
| 4                     | Repository Technologies Inc.    | 11      |
| 7                     | S&S Software International Inc. | 14      |
| 29                    | Softmart                        | 15      |
| 21                    | SofTouch Systems                | 1       |
| 6                     | Stardock Systems                | 9 & 12  |
| 12                    | The Weather Channel             | 17      |
| 1                     | Veritas                         | 8       |
| 8                     | Voice Pilot Technologies, Inc.  | 14      |
| 14                    | Watcom                          | 18      |

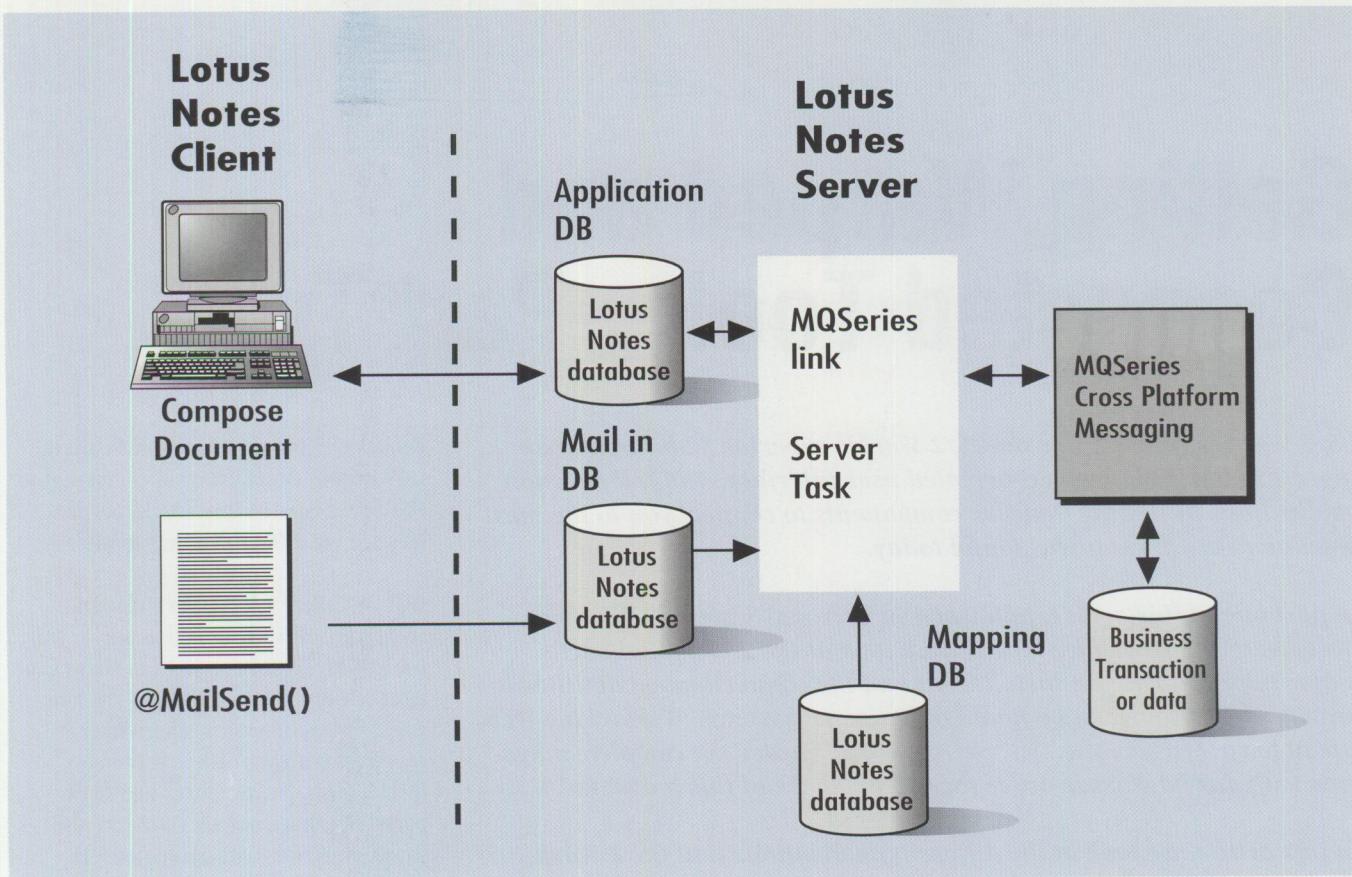


Figure 5. MQSeries link Components

To accomplish it, you set up a Notes database containing two fields: a customer number and credit-line field. Write a Notes application (a Notes form) to accept the customer number, store that customer number into a Notes document, and issue a `mailsend` command that mails the customer number and a mapping database identifier to the Notes server (the mail-in database).

When the link task receives that customer number and mapping database entry identifier, it uses the mapping database to construct an MQSeries message, which contains the customer number. That message, using MQSeries routing, then flows to an enterprise server that runs the transaction to query the credit line. The enterprise transaction generates a reply message that flows back to the link task.

The link task reads that message, finds the correct entry in the mapping database, and applies the credit line to

the original document. This allows the user to see both the customer number and credit line in the same Notes document.

### Where Do We Go from Here?

This article shows how the MQSeries link for Lotus Notes can be used in real life. By eliminating the need to retype information, the link improves employee productivity and decreases errors.

In addition to MQSeries link for Lotus Notes, IBM also offers CICS link for Lotus Notes. Intended for organizations that already have CICS installed and that are not interested in MQSeries' time-independent feature, CICS link works like MQSeries link, except that it uses CICS to communicate from the Notes server to the host system. In this case, the host system must be one of the platforms that support CICS (e.g., MVS, VSE, NT, AIX, OS/2, or HP).

Both IBM and Lotus see MQSeries link for Lotus Notes and CICS link for Lotus Notes

as strategic products, clearly demonstrating the synergy of the Lotus products and the classic IBM transactional products. We will certainly continue to focus on this product, improving and enhancing it. As Lotus Notes Version 4 rolls out with its Lotus Script support, additional opportunities for enhancements to this bridging technology will become available.



**Wayne Schutz** is an MQSeries and CICS consultant in the Integrated Systems Solution Corporation, Sterling Forest, New York. His job responsibilities include MQSeries consulting and developing the

MQSeries link and CICS link products. Since joining IBM in 1977, Wayne has worked in all areas of programming. He has both Bachelor's and Master's degrees in Electrical Engineering from the New Jersey Institute of Technology. His Internet ID is `wschutz@vnet.ibm.com`.

# Getting Warped and Connected Too!—Part Two

***OS/2 Warp Connect builds on OS/2 Warp's superior 32-bit multitasking, crash protection, object-oriented user interface, and full-function applications by adding network components to connect you to the most popular network resources found today.***

***In part one of this article, published in Personal Systems' November/December 1995 issue, we took a close look at OS/2 Warp Connect's major improvements in installation and the connection capabilities it provides. (Part one can be found on Personal Systems' World-Wide Web site at <http://pscc.dfw.ibm.com/psmag/>, or order the complete magazine with our back issue order form in the back of this magazine.)***

***In this article, we look at the different applications that OS/2 Warp Connect provides to make use of your connections. These applications include the transmission control protocol/internet protocol (TCP/IP) suite of applications and the new IBM OS/2 Peer.***

**N**ow that we've covered the different ways to get connected with OS/2 Warp Connect, let's talk about the applications you can use over these connections.

---

**Edward Duhe**  
IBM Corporation  
Roanoke, Texas

---

**Bret Curran**  
Curran Consulting  
Denton, Texas

## **OS/2 Peer**

One of OS/2 Warp Connect's most exciting components is the new OS/2 Peer. With OS/2 Peer, you have a full-function, peer-to-peer environment for OS/2 with significant interoperability and coexistence capabilities.

In the past, you could achieve limited peer function with LAN

Requester. That peer function is still in LAN Requester, and we will compare it to OS/2 Peer later in this article. For now, let's see what OS/2 Peer has to offer.

IBM OS/2 Peer 1.0 is both client and requester software as well as server software. With OS/2 Peer, you can share your local resources with others on your network, just as others can share their resources with you. These resources include disk, printer ports, and COM ports—but that's not all. OS/2 can also share clipboards and create network dynamic data exchange (DDE) links. All of these functions can be accessed through several different interfaces, including the command line and a graphical user interface (GUI).

A major OS/2 Peer function is requester support for OS/2 LAN Server. This means that some of OS/2 Peer's function and

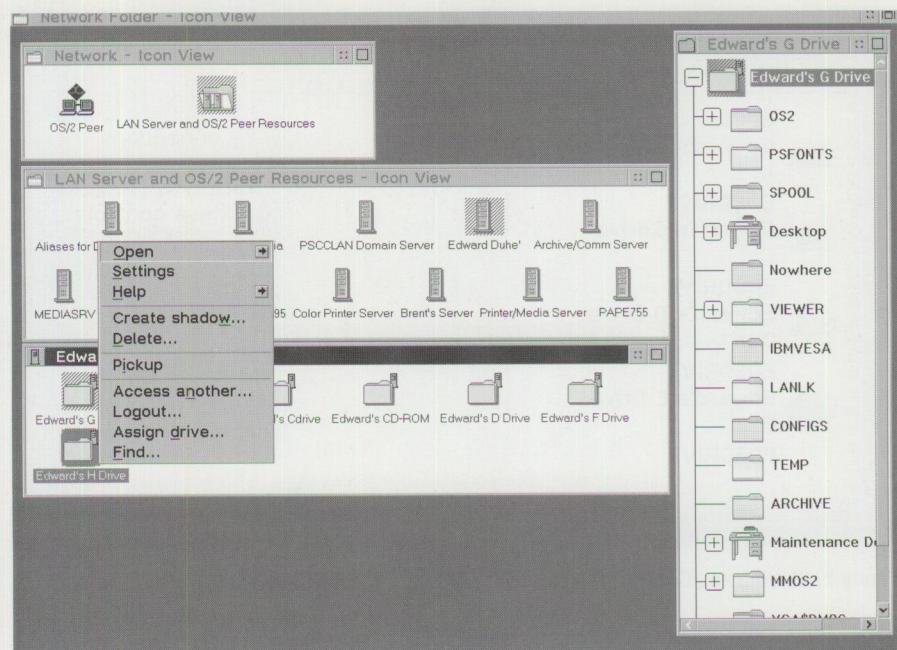


operation is the same as in LAN Requester. Like OS/2 LAN Requester, OS/2 Peer can use the Network folder (Figure 1) to perform tasks such as connecting to servers that provide a set of default connections to resources (logon assignments), creating desktop objects for network resources, managing public and private applications, printing files, and copying and moving files onto network drives. The Network folder adds your network resources to your Workplace Shell, so that you can interact with the resources and manipulate them the same way you do with local resources.

Network Messaging is another feature in both OS/2 Peer and LAN Requester. Network Messaging enables you to send and receive messages on the network. (You must be logged on to receive or send messages with the Network Messaging function.) You can also configure Network Messaging to notify you via pop-up windows when a message arrives or to receive the message without notification. When you install OS/2 Peer and LAN Requester, Network Messaging is placed in the Startup folder and is configured to notify you when you receive a message.

Another way to share data between workstations on the LAN is through the Network DDE and Clipboard function of OS/2 Peer and LAN Requester. The Network DDE and Clipboard function extends your DDE and clipboard across the network, allowing users to access your local clipboard as well as allowing you to access their local clipboards. You can also save the contents of your clipboard into *clippings*, enabling you to share multiple sets of data. Through the Clipboard Sharing and Network DDE interface, you can control access to your clipboard, view current connections, save and copy clippings, and link to data across the network.

OS/2 Peer and LAN Requester also have Error and Audit Log Utilities. The Error Log Utility provides an interface that allows you to view and print the information logged in the ERROR.DAT file. The ERROR.DAT file can contain information about network software internal errors, network services errors, and OS/2 internal errors. You can view another machine's error log on the network if you are logged onto that machine with a



**Figure 1. Network Folder**

userid that has administrator authority. With the Audit Log Utility, you can browse a log created by the auditing function of an OS/2 LAN Server or OS/2 Peer machine. The audit log typically contains security and accounting information.

OS/2 Peer's GUI lets you easily operate the Peer requester and server functions. As we go through the different functions of OS/2 Peer, you will become familiar with the GUI and how it operates. A command-line interface is also available, making it easy to run commands from a .CMD or REXX file. You will also find that many of the commands and syntaxes of the command-line interface are the same in OS/2 Peer and LAN Requester.

Before you can start using OS/2 Peer, you must first log on. The default userid and password for OS/2 Peer are USERID and PASSWORD. All userids and passwords, as well as group definitions, are administered through User Profile Management (UPM). It's always a good idea to go into UPM, add your own userid and password as an administrator, and then delete the user USERID. This prevents others from gaining access to your system using the default user.

There are several different ways to log on. It is important, particularly in a LAN Server environment, that you understand

these different logon types and where the verification will be handled.

■ **Local logon with local verification** is typically used for products like DB2 for OS/2. To perform a local logon with local verification from the command line, enter LOGON /L.

■ **LAN logon with local verification** is what OS/2 Peer uses to log you onto the LAN and verify your userid and password at your local workstation. This type of logon is necessary to administer your peer services at your workstation. At the command line, enter LOGON /V:LOCAL.

■ **LAN logon with domain verification** is used to log on to an OS/2 LAN Server domain. At the command line, enter LOGON /V:DOMAIN.

If you are using OS/2 Peer in a LAN Server environment, it is important to make sure that your userid and password on your OS/2 Peer workstation are the same as the userid and password defined for your LAN Server logon. This enables you to administer your local peer resources while logged onto the LAN Server environment.

With OS/2 Peer installed, you have several objects on your system with which to log on. There is a Logon object in the UPM folder and LAN Server Logon and

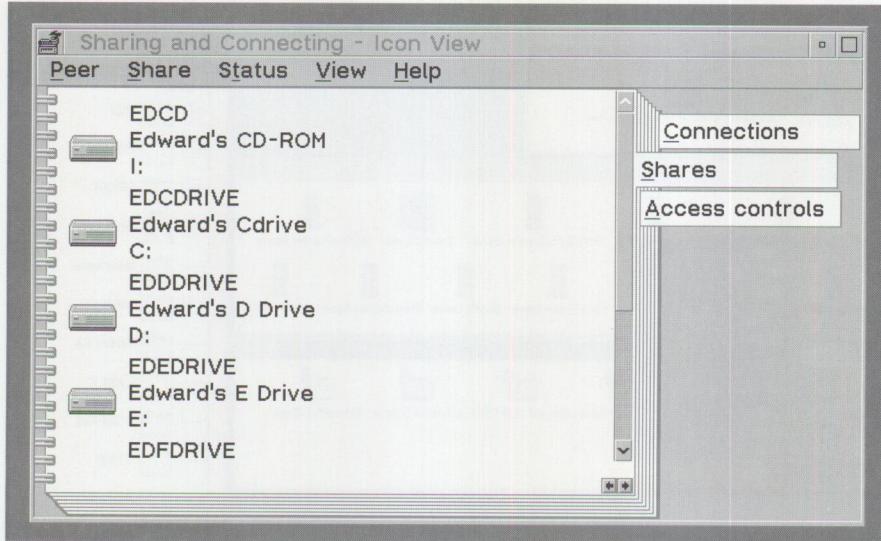


Figure 2. Sharing and Connecting Notebook with Share Profiles Displayed

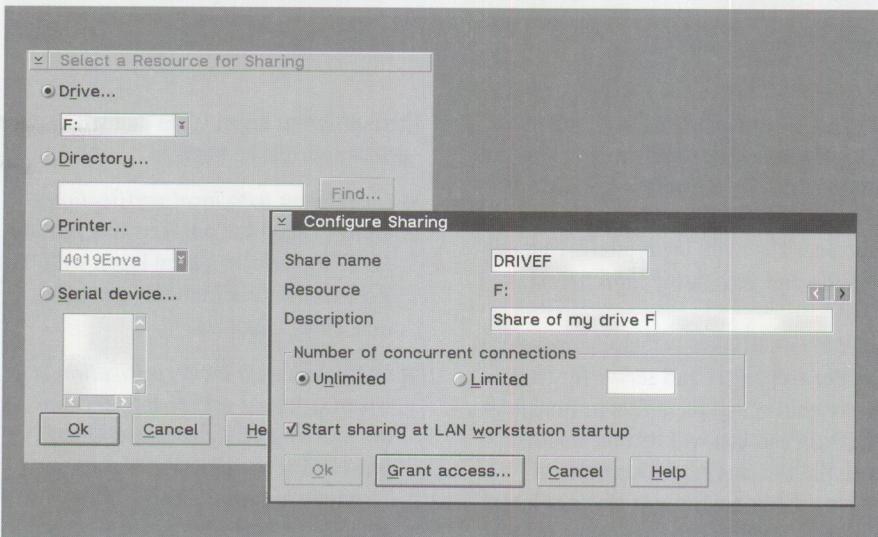


Figure 3. Configure Sharing Dialog Box

OS/2 Peer Workstation Logon objects in the OS/2 Peer folder. As the object titles imply, objects in the OS/2 Peer folder will log onto a LAN Server (using LAN logon with domain verification) or an OS/2 Peer workstation (using LAN logon with local verification). If you have enabled OS/2 Peer or LAN Requester, the UPM logon object will first initiate a LAN logon with local verification, then a local logon with local verification.

### Mom Always Said to Share

OS/2 Peer enables you to share your disk drives, directories, printer ports, and COM ports. When sharing disk drives, you should consider how much of the drives to share. For example, if you want to share only a few files with a co-worker,

you probably don't want to share your entire drive. To limit sharing, make a directory to contain only those files you intend to share. Likewise, if you are sharing an application, you might want to contain the application within one directory, so that it can be shared with one connection instead of multiple shares and connections.

Sharing COM ports allows you to share devices such as modems. OS/2 Peer allows you to share COM ports in a pool. Using this method, you can create a modem pool for other LAN users. A modem pool allows a request for use of a modem to take the next available port. If no port is available, the request will be queued up either until one is available or until the

request times out. The length of the timeout is determined by the value of the CHARWAIT parameter in the IBMLAN.INI file. By default, this parameter is set to 3600 seconds (1 hour). Two other relevant parameters in the IBMLAN.INI file are MAXCHDEVS and MAXCHDEVQ. MAXCHDEVS specifies the number of ports that can be in a shared pool; the default is 2. MAXCHDEVQ determines the number of shared pools; its default is also 2.

You can assign more than one port to a single printer queue. This allows you to pool printers. Jobs entering the print queue are printed on the first available printer. When using printer pooling, all the printers must use the same print driver.

The first time you share resources on your OS/2 Peer workstation, you will create a share profile containing all the information about the shared resource. Each shared resource has a share profile displayed as an icon in the Sharing and Connecting Notebook (see Figure 2).

OS/2 Peer has several ways to share. Let's look at the different ways to share a disk drive.

**■ Sharing through an object's pop-up menu**—OS/2 Peer imbeds itself into the Workplace Shell, making its functions available to all the appropriate Workplace Shell objects.

For example, suppose you have a hard-disk drive F: on your system, and you want to start sharing it. If you bring up the drive F: object's pop-up menu, you see a share option displayed. If you select the share option, one of two things happens:

- If you are not currently logged on, you are prompted to do so. Once logged on, you can go back to the share option on the pop-up menu.
- If you are logged on and have not created a share profile for the F: drive, the Configure Sharing dialog box appears (Figure 3). In this box, provide the necessary information to create the share profile.

The share profile has several parameters determining how the share is performed. These parameters include the number of concurrent connections,

whether you want this share to start automatically at each startup, and the *share name*—the name by which others will refer to this resource.

Unlike a LAN Server environment, OS/2 Peer does not refer to resources by aliases. In an OS/2 Peer environment, resources are referenced by their universal naming convention (UNC). For example, the UNC for a drive may be \\mypeer\drivef where mypeer is the machine name and drivef is the share name.

After the share profile is filled out, you select Grant access. The Grant access screen allows you to create either a basic access profile or a customized access profile. A *basic access profile* provides a default profile used for all users accessing this resource. A *customized access profile* enables you to specify which users and groups are allowed to access this resource.

When you complete these screens, the share operation is complete and drive F: is now available for users to access.

**Sharing through an object's Settings menu**—A shareable object's Settings notebook has a Shares tab and an Access controls tab, as shown in Figure 4. By using these pages in the Settings notebook, you can create the share profile and begin sharing the device.

**Sharing using drag-and-drop**—This method uses the Sharing and Connecting program in the OS/2 Peer folder. Start the Sharing and Connecting program, select the Shares page, then drag and drop a printer or directory resource object into the share page of the Sharing and Connecting program. This method works only for printers or directory resource objects.

**Sharing by copying**—If you have already created a share profile for one resource, you can copy it to create a new share profile for a different resource. This is done on the Shares page of the Sharing and Connecting program notebook. Use the right mouse button to get the pop-up menu of the share profile you would like to copy. Select Copy, then select the resource for which you want to create the profile. Fill out the profile information and save it.

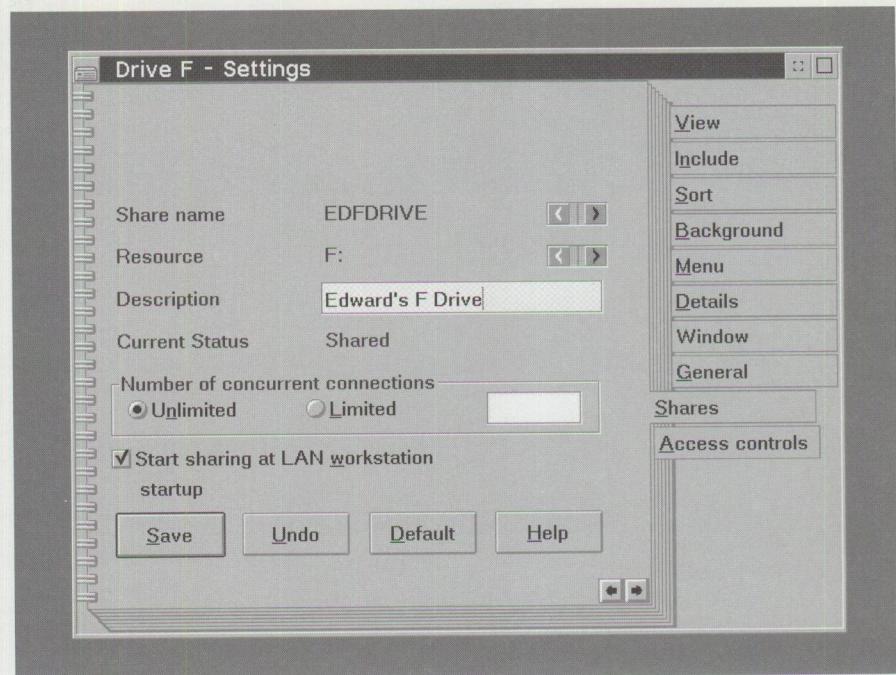


Figure 4. Example of a Settings Notebook for a Shareable Object

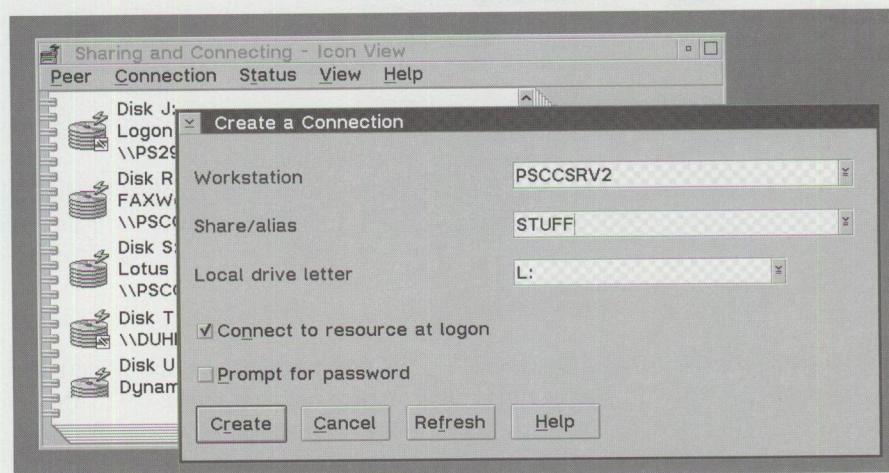


Figure 5. Create a Connection Screen

**Sharing from pull-down menu**—From the Sharing and Connecting program notebook, you can select the Shares page, then select the share option from the action bar. Here, you have the option to create a share profile. Select Create, then the resource you want to share. Fill out the profile information and grant access. The share completes upon closing the profile.

**Sharing by command line**—As mentioned earlier, OS/2 Peer's command-line commands and syntaxes are essentially the same as those for OS/2 LAN Requester. To share drive F: with a netname of DRIVEF, enter NET SHARE DRIVEF=F:. For more information

about the NET SHARE command, see the *Commands and Utilities* online book.

The methods you use to share a resource can also be used to stop sharing a resource. Pick the method that best fits your needs for working with your shared devices. You'll probably find that you use a combination of methods depending upon the circumstances.

## Connecting to Devices

Just as there are several different ways to share devices with OS/2 Peer, there are several ways to use or connect to devices as well. As with sharing, you will want to choose the method that best suits the way you work.

| Warp Connect Client                      |                  | Server         |                 |                              |                        |                  |                       |
|--|------------------|----------------|-----------------|------------------------------|------------------------|------------------|-----------------------|
|  |                  | LAN Server 4.0 | LAN Manager 2.2 | Windows NT Advanced 3.5 3.11 | Windows for Workgroups | NetWare 3.12/4.x | DOS LAN Services Peer |
| OS/2 Peer                                | All functions(1) | L,U,M(1),G,S   | L,U,G,A,B       | U,B                          | N/A                    | U                |                       |
| OS/2 LAN Requester                       | All functions(1) | L,U,G,S,M(2)   | L,U,G,A,M(3)    | U                            | N/A                    | U                |                       |
| NetWare Requester                        | N/A              | N/A            | N/A             | N/A                          | All functions          | N/A              |                       |
| OS/2 Peer and NetWare Requester          | All functions(1) | L,U,M(1),G,S   | L,U,G,A,B       | U,B                          | All functions          | U                |                       |
| OS/2 LAN Requester and NetWare Requester | All functions(1) | L,U,M(2),G,S   | L,U,G,A,M(3)    | U                            | All functions          | U                |                       |

#### Legend:

**L** = Logon to the server  
**U** = Use the server's resource  
**H** = Home directory assigned  
**N** = Network application  
**G** = Guest account access accepted

**A** = Logon assignments  
**M** = Manage server resources  
**S** = Logon scripts  
**B** = Browse and connect to resources  
**N/A** = No access

#### Notes:

- 1 = You can manage servers by using the NET ADMIN command
- 2 = Group definitions can be managed; other administrative functions allow for displaying only
- 3 = User and group definitions can be managed only from the GUI (NET ADMIN not supported)

Figure 6. Warp Connect Client Interoperability

■ *Connecting through the Sharing and Connecting program*—The Sharing and Connecting program notebook has a page called Connections. From this page, you can select Connection from the action bar to create a connection.

The Create a Connection screen (Figure 5) prompts you for the name of the resource and the workstation on which it resides. For example, this may be the name of a peer workstation or a domain to which you have access. You can select the workstation from the pull-down menu for that field. The Share/Alias field also has a pull-down menu where you can pick the name or alias of the resource to which you want to connect. Then, depending upon the type of resource you are connecting to, you specify the local device drive letter, printer port, or serial port to which you want to assign this resource. If you want to automatically connect to this resource at logon, click on the checkbox

labeled as such (this is the default). If you are connecting to an OS/2 LAN Requester configured as a peer or to a Windows for Workgroups peer, you may have to enter a password to connect. Click on the Prompt for Password box to enable the Specify Password window when connecting to the resource.

■ *Connecting by copying*—Similar to the way you are able to share by copying an existing share profile, you can connect by copying an existing connection icon in the Sharing and Connecting program notebook. Selecting Copy brings up the Create a connection dialog and prompts you for the necessary information to make your connection.

■ *Connecting by command line*—You can connect to resources using the NET USE command on an OS/2 command line. For example, to use a resource located on MYPEER with a netname of DRIVEF as your local drive I:, enter NET USE I:

\MYPEER\DRIVEF. For more information about the NET USE command, see the *Commands and Utilities* online book.

One thing to remember when using the NET commands is that they do not alter or create resource profiles.

#### If You Share It, They Will Come

OS/2 Peer gives you a full-function peer when you are participating with other OS/2 Peer and OS/2 LAN Server machines. OS/2 Peer is equally as strong in its ability to interoperate with other LAN software systems. OS/2 Peer interoperates with any server message block (SMB)-compliant peer or server on a LAN. This includes Microsoft LAN Manager 2.x, Windows NT Advanced 3.5, Windows for Workgroups 3.11, DOS LAN Services Peer, and even PCLP 1.3. Figure 6 shows some of the capabilities of interoperating with OS/2 Peer and other LAN software.

## LAN Requester

With all the function in OS/2 Peer, you may wonder why OS/2 LAN Requester would be used in an OS/2 Warp Connect environment.

As discussed previously, LAN Requester provides many of the same functions as the OS/2 Peer, including some peer function. However, LAN Requester provides something that OS/2 Peer does not—the OS/2 LAN Server Administration GUI. If you need to administer an OS/2 LAN Server domain or server using the administration GUI, you will need to install OS/2 LAN Requester. LAN Requester and OS/2 Peer cannot coexist; you must choose one or the other.

LAN Requester does provide some peer function, but it is limited. You can share with only one user at a time. You cannot share multiple printer or serial ports. And you do not have a peer GUI.

If you want to install the Peer services for LAN Requester, you will have to install it from the OS/2 Warp Connect CD using PRODINST.EXE, or you can create the LAN Requester diskettes and install from them. You should also be familiar with the LAN Server commands, because you must do the LAN Requester Peer Services setup and administration from the command line.

In an environment where OS/2 Peer workstations need to browse the LAN Requester Peer Services workstation's resources, you need to share the LAN Requester Peer Services workstation's IPC\$ resource. IPC\$ is an interprocess communications resource and is not shared by default on a LAN Requester Peer Services workstation with share-level security. To share IPC\$, start peer services, log on, and enter NET SHARE IPC\$.

LAN Requester can also interoperate with other LAN software. LAN Requester is an SMB-based application and can interoperate with other SMB-based LAN software. Figure 6 shows some LAN Requester interoperability capabilities.

## NetWare Client

NetWare Client 2.11 comes with OS/2 Warp Connect and enables access to Novell NetWare 3.x and 4.x servers. Not

much is new about the NetWare Client in OS/2 Warp Connect; it is the same NetWare Client that has been available for some time. But one of the biggest enhancements comes in the way of coexistence.

If you have ever tried to configure your OS/2 system with LAN Requester, TCP/IP, and NetWare Client, you know that it takes some effort to get them all loaded and operating together. Now, with the OS/2 Warp Connect install, the products easily install and operate together.

## *Objects in the TCP/IP folder are configured for use in a LAN-attached environment.*

If you are installing the NetWare Client as your only networking software, you can install the native NetWare open datalink interface (ODI) drivers. However, if you install any of the other networking products along with the NetWare Client, you must install Multiple Protocol Transport Services (MPTS) and configure NetWare to use the ODI2NDI driver. ODI is Novell's solution for supporting multiple protocols and is similar to the functions that network driver interface specification (NDIS) provides. But the ODI drivers and NDIS drivers cannot use the same card at the same time. To overcome this problem, IBM has developed the ODI2NDI driver, which provides an interface to the ODI stack. With the ODI2NDI driver, the NetWare protocol drivers are able to use the NDIS interface, so that the NetWare protocols can coexist with the other NDIS protocols on the same adapter.

When installing the NetWare Client with OS/2 Warp Connect, the install program uses your network card's universally administered address (UAA) as the NETADDRESS statement in the PROTOCOL.INI file's ODI2NDI section. This causes a problem if you are migrating a workstation that already has a locally administered address (LAA) defined in the PROTOCOL.INI file's NetBIOS section. The NETADDRESS statement in both the NetBIOS section and the ODI2NDI section of the PROTOCOL.INI file must match. To

correct the problem, you can edit the PROTOCOL.INI and match the two addresses.

## The TCP/IP Suite

In part one of this article, we discussed how TCP/IP for OS/2 can connect you to TCP/IP networks. Now, let's discuss the applications that TCP/IP for OS/2 supplies to enable you to use these connections.

TCP/IP for OS/2 3.0's installation creates two folders on your system: the TCP/IP folder located in the OS/2 System folder and the IBM Internet Connection for OS/2 folder located on the desktop.

Several of the objects in these folders and their sub-folders are identical. The Internet Connection for OS/2 folder contains objects that are useful when connecting to the Internet over a serial line internet protocol (SLIP) or point-to-point protocol (PPP) connection.

Several Internet Connection for OS/2 objects check to see if you already have a SLIP or PPP connection before launching the application. If you do not have a connection, you are prompted to call to establish the connection before starting the application. This is done by using a utility named LINKUP. If you look at the settings for a program object in the Internet Connection folder (for example, WebExplorer), you see that the program being executed is LINKUP.EXE, and the EXPLORE.EXE file is referenced as a parameter.

Objects in the TCP/IP folder are configured for use in a LAN-attached environment. The program objects in the TCP/IP folder do not run the LINKUP.EXE program and, therefore, do not check to see if you are connected through your dialer.

The functions provided with TCP/IP for OS/2 3.0 include both client and server functions. Client functions include: Telnet for ASCII and EBCDIC terminal emulation; file transfer protocol (FTP) for transferring files between another TCP/IP host; and TALK client for interactively "chatting" with another TCP/IP host that is running the TALKD server. Server functions include: TelnetD server, which enables another TCP/IP host to use Telnet to log on to an OS/2 full-screen session; FTPD server, which enables a TCP/IP host

| <b>Client Applications</b>                                 | <b>Description</b>   |
|--|--|
| <b>Telnet</b>  | Provides ASCII terminal emulation, enabling you to log on to a remote host as an ANSI, VT100, VT220, HFT, or NVT terminal.   |
| <b>TelnetPM</b>  | Provides the same function as Telnet, but is a Presentation Manager application.   |
| <b>Telneto</b>   | A VT220 telnet emulator.   |
| <b>TN3270</b>  | An OS/2 full-screen 3270 terminal emulator.  |
| <b>TN5250</b>  | An OS/2 full-screen 5250 terminal emulator.  |
| <b>PMANT</b>   | A Presentation Manager 3270 emulator.  |
| <b>File Transfer Protocol (FTP)</b>                        | Enables file transfers between the client and a remote host that is running an FTP server. FTP uses a command-line interface.  |
| <b>File Transfer Protocol Presentation Manager (FTPPM)</b> | Provides the same function as FTP, but does so with a Presentation Manager interface for ease of use.  |
| <b>Trivial File Transfer Protocol (TFTP)</b>               | Provides the same basic function as FTP, but transfers only one file at a time and cannot authenticate users. TFTP enables file transfer between the client and a remote host running a TFTP server. |
| <b>NewsReader/2 (NR2)</b>                                  | Enables you to read and append to Internet news groups.  |
| <b>SENDMAIL</b>  | Enables you to send mail without using a mail interface such as LaMail or Ultimail.  |
| <b>TALK</b>  | Gives you the capability of an interactive electronic "chat" session with a remote machine running the TALK server.  |
| <b>BOOTP</b>   | Used to find the Internet address for a client from a BOOTP server.  |
| <b>PORTMAP</b>   | As a client, the portmapper program queries a host system to determine which port number on which service is being offered.  |
| <b>LPR</b>   | Allows you to print files to a remote host that is providing print spooling services.  |
| <b>REXEC</b>   | Enables you to send a command to a remote host running the REXEC server.   |
| <b>Gopher</b>  | Helps you access information stored on Gopher servers on the Internet. Gopher uses menus to find information.  |
| <b>WebExplorer</b>   | A World-Wide Web (WWW) hypertext browser for OS/2, it provides a graphical, interactive interface to assist you in finding, displaying, and obtaining information on the Internet.                   |
| <b>Server Applications</b>                                 | <b>Description</b>   |
| <b>TELNETD</b>   | The telnet server that allows other TCP/IP hosts to log on to your system.   |
| <b>FTPD</b>  | The file transfer protocol server that enables FTP clients to upload and download files from your system.  |
| <b>TFTPD</b>   | The trivial file transfer protocol server that allows file transfer using the TFTP client.   |
| <b>TALKD</b>   | Supports interactive "chat" sessions when used with the TALK client.   |
| <b>ROUTED</b>  | An IP router that can forward IP frames between two networks.  |
| <b>SNMPD</b>   | Provides network management capabilities with the simple network management protocol (SNMP).   |
| <b>BOOTPD</b>  | Responds with an Internet address for a BOOTP client request.  |
| <b>LPD</b>   | Provides print server functions utilizing the OS/2 print spooler.  |
| <b>REXECD</b>  | Receives commands from the REXEC client and executes them on the host machine.   |
| <b>Ultimedia Mail/2</b>                                    | Uses simple mail transfer protocol (SMTP) and the multipurpose internet mail extensions (MIMEs) to transfer mail between TCP/IP hosts.   |
| <b>SENDMAIL</b>  | As a server, sends and receives mail using SMTP.   |
| <b>PORTMAP</b>   | Enables a protocol to define a network service.  |
| <b>INETD</b>   | A super server that starts any of the other servers within a single task. The drawback is that you cannot specify parameters for the servers when they start.  |

Figure 7. Some Client and Server Applications in TCP/IP for OS/2 3.0

using FTP to access files for uploading and downloading; and TALKD, which enables interactive "chat" between two TCP/IP systems.

Figure 7 lists most of the client and server applications provided with OS/2 Warp Connect's TCP/IP for OS/2 3.0.

## WebExplorer

The applications listed in Figure 7 give you access to many different resources, particularly when you use these applications on the Internet.

Probably the most talked-about Internet resource today is the World-Wide Web (WWW). It seems everybody who is anybody is surfing the Web! So let's talk about WebExplorer, OS/2 Warp's World-Wide Web browser.

WebExplorer 1.01 is included with TCP/IP 3.0 in OS/2 Warp Connect. However, you will want to keep up with the newer versions, because enhancements are constantly being made. You can retrieve the latest WebExplorer "golden" code as well as the latest betas from the Internet. FTP to <ftp://ftp.ibm.net> to find the WebExplorer files in the /pub/WebExplorer directory. At the time this article was written, WebExplorer 1.03 was the latest production version, and it contains some nice enhancements over the earlier version.

WebExplorer 1.03 adds support for many HTML 3.0 extensions including text wrapping around images, background bitmaps or wallpaper, and multi-color text.

Previous WebExplorer versions allowed you to drag and drop in-line graphics from Web pages into a desktop folder, thereby copying the graphic into the folder and creating an object for it. WebExplorer 1.02 added the capability to drag and drop uniform resource locators (URLs). If you select (using the right mouse button) anything other than a graphic on a Web page and drag it to a folder, WebExplorer creates an object that references the URL of that Web page. The next time you want to go to that page, you can simply drag and drop the URL object onto the running WebExplorer, and presto—you're there! This new feature enables you to organize your frequently accessed Web pages into different folders,

**IBM OS/2 Warp Home Page—**  
<http://www.austin.ibm.com/pspinfos/os2.html>

**OS/2 Warp Migration Assistant—**  
<http://pscc.dfw.ibm.com/warpmi/>

**Team OS/2 Online—**<http://www.teamos2.org/>

**OS2Web—**<http://www.teamos2.org/os2web>

**OS/2 Warp Pharmacy—**  
<http://www.zeta.org.au/~jon/WarpPharmacy.html>

**OS/2 Software Library—**  
<http://www.state.ky.us/software/os2.html>

**IBM PC Company Home Page—**<http://www.pcco.ibm.com>

**IBM Home Page—**<http://www.ibm.com>

**Personal Systems Home Page—**<http://pscc.dfw.ibm.com/psmag/>

**Software Quarterly on the Internet—**<http://pscc.dfw.ibm.com/sq>

**OS/2 Shareware BBS—**<http://www.os2bbs.com>

**OS/2 WWW Home Page—**  
<http://www.mit.edu:8001/activities/os2/os2world.html>

Figure 8. OS/2-Related Web Sites

rather than having them all bundled under the Quicklist menu option.

Another WebExplorer feature, one that is not well known, is its ability to configure the number of threads used by TCP/IP to download a Web page. The default number of threads used by WebExplorer is four. By increasing the number of threads, you may be able to decrease the time it takes to load a Web page. Your mileage will vary, depending upon the page being downloaded, the bandwidth of your connection, and so on, but increasing the number of threads can help in typical situations. To increase the number of threads to eight, specify the `explore -t 8` parameter on the command line when executing WebExplorer.

*Note:* The `t` must be lowercase and preceded by a dash. There must be a space between the `t` and the number of threads with which you wish to run.

Other command-line parameters supported with WebExplorer are `-p` for making WebExplorer palette-aware (i.e., it uses the

palette of the graphics shown on Web pages); and `-q` (for quiet) for suppressing the product information and copyright screen that comes up when you start WebExplorer, as well as the "Are you sure?" screen when exiting WebExplorer.

WebExplorer is always being enhanced to take advantage of the best technology available on the Web. For more information about what's coming in the way of enhancements to WebExplorer, check the World-Wide Web site <http://www.raleigh.ibm.com/WebExplorer/whatsahd.html>. While you are surfing the Web, you may want to check out some of the other OS/2-related web sites listed in Figure 8. They offer valuable information about the OS/2 family of products, as well as an assortment of other goodies.

TCP/IP for OS/2 3.0 gives you all the tools you need to navigate your network—even if that network is the Internet.

If you are familiar with the TCP/IP for OS/2 2.0 products, you know that IBM

offers several add-on packages that provide additional functions. These add-on packages include things like Network File System (NFS) support and X-Windows support. The Version 2 add-on packages are supported, and they work on the new TCP/IP for OS/2 3.0 base.

## Tools to Use with Your Connections

OS/2 Warp Connect also includes a few tools that can make you more productive in using your new connected environment.

### Network SignON Coordinator

Network SignON Coordinator gives you a way to perform a signon/signoff operation on multiple systems. Network SignON Coordinator gives you a single point to manage your passwords on OS/2 LAN Server domains, NetWare servers, hosts, and local facilities. With this tool, you can enter your userid and password at a menu and have your logon request processed at any number of OS/2 LAN Server domain controllers, NetWare servers, and hosts.

### AskPSP

- AskPSP is a database of answers to questions and problems concerning OS/2 Warp, LAN Requester, LAN Distance, and NetWare Client for OS/2. AskPSP uses CasePoint, an intuitive search tool that helps you find the answers you seek. You can use keywords or full sentences to describe your problem, and AskPSP presents you with questions to further refine your search.

Updated AskPSP information is available on the Technical Connection CD-ROM. This CD-ROM is updated on a periodic basis. For more information about the Technical Connection CD-ROM, call (800) 992-4777.

### Lotus Notes Express

The third CD-ROM that comes with OS/2 Warp Connect contains Lotus Notes

Express, which is the entry product into the Notes family. There are three tiers:

- Notes Express, which comes with predefined databases and lets you access only those types of databases
- Notes Desktop, which adds the ability to access any type of Notes database
- Notes, the full version, which adds the administration and development tools

If you want to upgrade, Lotus has made it simple. You'll just need to upgrade your server's address book—you do not have to add any software to your client or server to perform the upgrade. Of course, the price you pay for this ease of use is in disk space. Plan on using about 40 MB for a default installation of the Lotus Notes Express product. Lotus Notes Express in OS/2 Warp Connect comes with seven Notes database templates, which is two more templates than standard Notes Express has. The seven databases are:

- Name and Address
- Customer Tracking
- Discussion Database
- Mail
- News
- Phone Book
- Reference Documents

### CONNECTed and Happy

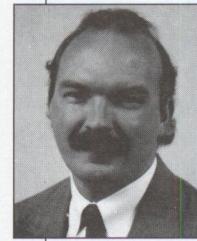
OS/2 Warp Connect is full of networking products that get you connected in almost any environment. One of its most impressive applications is the one that installs the components of OS/2 Warp Connect, even over a LAN. The networking products that make up OS/2 Warp Connect have been enhanced and tuned to work in this environment.

If you're aiming to get connected in your local LAN environment or to the

Internet, OS/2 Warp Connect is the coolest way to go!

## References

For more information about the base OS/2 Warp operating system and what is new in it, refer to *Personal Systems' January/February 1995 issue*. The "OS/2 Warp" article from that issue can be found on *Personal Systems' home page* on the Internet at <http://pscc.dfw.ibm.com/psmag/>.



**Edward Duhe'** is an advisory market-ing support repre-sentative in the IBM Personal Systems Competency Center in Roanoke, Texas. He provides technical support for LAN Distance

and OS/2. Edward joined IBM in 1987 as a systems engineer in South Louisiana. He has a BS degree in Business Administration from Louisiana State University and can be reached via Internet at [eduhe@vnet.ibm.com](mailto:eduhe@vnet.ibm.com).



**Bret Curran** is an independent OS/2 systems consultant, specializing in helping corporations install, configure, and manage large OS/2 networks. He is also involved with OS/2 publishing

and has been part of a team that has authored several of the OS/2 certification tests. Bret has a bachelor's degree and a MBA in Business Computer Information Systems from the University of North Texas. You can reach Bret at [curranb@ibm.net](mailto:curranb@ibm.net). Look for the book titled *OS/2 Warp Administrators' Survival Guide* by Bret and co-author David Kerr (ISBN 0-672-30744-8).

# Questions and Answers

**The following questions and answers about Lotus Notes are from the Lotus Notes Knowledge Base.**

## How can I purge the NotesView database of unwanted statistics and alarm data?

Once you've decided what to purge, use the following steps to purge the database:

1. Choose **File, NotesView Database**, then **Purge**.
2. Select the statistics to delete.
3. Select **Condense to daily summary** and enter a time period (optional).
4. Select the alarms to delete.
5. Click on **OK**.

**When I compose a document using a form created with a Read Access List (RAL), the RAL is stored in the \$Readers file. If the RAL is changed in the form design and names are added and/or deleted, running Tools - Refresh Fields does not update the RAL (\$Readers field) nor does editing and saving the existing documents. Is there a workaround?**

The Read Access List is not a part of the form that Tools Refresh updates. Tools Refresh updates formulas in fields from a given form that a document uses. Since the RAL is not a field (it is part of the form attributes applied to a document only at creation), and the \$Readers field has no formula, Tools Refresh does not change the RAL.

The following two methods assume that you have not yet created any documents. That is, you seek to avoid the problem in the future when you will need to add or remove people from the Reader Access List.

**Method 1.** Create an Access Role, which is a list containing a subset of the users and groups defined in the database's Access

Control List (ACL). This role is used in the Read ACL and can be updated to maintain access control without a need to update each document.

**Method 2.** Create a computed field with a data type of Reader Names. Updating the formula in a computed field and then refreshing documents with that form will update the Reader Access List for those documents.

If you have already created documents and need to update the Reader Access List, you can use method 2 above, or you can create a macro that appends names to the \$Readers field as follows:

```
FIELD $READERS := $Readers : "John  
Smith"
```

## The cursor is not always positioned in the first editable field in a document in Edit mode. How can this happen?

When you open a document in Read mode, the cursor is near the left corner, on the first object, which is a button or a pop-up. When you open a document in Edit mode from the view level, Notes always places the cursor in the first editable field.

When you open a document in Read mode and place it into Edit mode, the cursor is in the first object, which is a button, a pop-up, a section, or an editable field. If the first object in Read mode is a *hide when* editing button or pop-up, then when you change the document mode from Read to Edit, the cursor will move to the first visible object, which is a button, a pop-up, a section, or an editable field.

This may cause unexpected results when using @Commands such as  
`@Command([EditDocument])` and  
`@Command([EditNextField])`.

## I have properly installed the Inter-Notes News Gateway on my server. The newsgroup articles are being

**transferred into the Notes News database; however, when articles are composed within Notes, they don't make it out to the newsgroup. What's the problem?**

There are several reasons why this might be happening. First, contact your Internet service provider to ensure you have been given the necessary authorization for posting.

If that's not causing the problem, it's possible the agent hasn't been running long enough to post to the newsgroup. Have your server administrator type TELL INNEWS TRANSFER at the Notes server running the InterNotes News Gateway.

It's also possible that the USENET server to which you posted the article is different from the one you are reading (for example, posting an article at work, then trying to read it at home), and there's not been sufficient time for the article to be posted from one server to the next.

**I have designed a form in Lotus Forms 1.0 that includes fields used with Notes FX. Some of the Notes FX fields have been set as required fields on the Format tab of the Properties box in Lotus Forms.**

**If one or more of the required fields is left blank when the form is used, the user gets the following prompt: "You must complete all required fields before saving or closing the file." Why doesn't Lotus Forms generate this prompt?**

When a user launches an embedded Lotus Forms form by selecting it from the Lotus Notes Compose menu, the Forms fields that have been set for Notes FX are automatically set to a value of NULL if no other data has been entered. The fields appear to be filled in; therefore, in Lotus Forms, the prompt is not generated.

## **Is it possible to sort or categorize a “Responses only” view column and maintain the response hierarchy?**

You can maintain the response hierarchy if you *sort* the “Responses Only” column but not if you *categorize* the “Responses Only” column.

## **How can I control outbound mail so that low or high priority messages are handled as normal priority?**

Effective in Notes 3.30 and higher, a new NOTES.INI parameter is available to control the flow of outbound mail. To make low priority and high priority messages route as normal, add the following parameter to the server's NOTES.INI file:

**MailDisablePriority=1**

*Note:* This setting affects both high and low priority mail at the same time.

This parameter lets you easily control mail routing via Connection documents. If you want to maintain the automatic routing of high priority messages but want low priority messages to flow during the day, use the **MailLowPriorityTime=** parameter.

**When I paste text I've copied from WordPerfect 6.1 into a Notes document, hyphens are inserted in unusual locations. For example, a hyphen may be inserted within a single word or in the middle of a sentence. If I look at the contents of the Windows clipboard, I don't see any hyphens in the text. Why does this occur and how can I prevent it?**

WordPerfect inserts a soft hyphen code when a word is cut. This code remains, even when the sentences are changed such that the words have no “visible” hyphens. To prevent the hyphens from appearing in Notes, change the Hyphenation Prompt setting in WordPerfect by selecting **Edit, Preferences, Environment, Hyphenation Prompt**, then **Never**.

Once you set the Hyphenation Prompt to **Never**, WordPerfect automatically controls the hyphenation by inserting an auto-hyphenation code. Notes will not insert a hyphen for the auto-hyphenation codes when text copied from WordPerfect is pasted into a document.

**How can I use Approach 3.x or Notes Reporter 1.0 to print the same record multiple times on a single sheet of mailing labels? For example, if a sheet of mailing labels contains three labels across and ten labels down, I want to print the information from one particular record on all 30 labels. Also, every sheet of labels should contain a new record.**

To print the same record multiple times on one sheet of labels, do the following:

1. Once you've designed the mailing label's layout, perform a find request to find the record to print.
2. Select **File**, then **Print**.
3. For Copies, enter the number of times you want to print the record on the page (30, in your example).
4. Click on **OK** to print the record multiple times on the page.

*Note:* You can create a macro to perform the steps detailed above.

1. Select **Find**, then **Go** to find mode and wait for input.
2. Select **View**, then **Switch** to mailing label.
3. Select **Print**, then **Set** options now. Enter number of copies and click on **OK**.

**I have designed a form in Lotus Forms 1.0 that contains combo boxes and list boxes. When I print the form from Filler, the selections I choose in combo boxes or list boxes don't print; however, field headings for the combo boxes and list boxes do print. In addition, if I add a bitmap to a command button, the command button prints without the bitmap image. How can I fix this?**

This problem is documented in the following excerpt from the Lotus Forms README.TXT file:

“Lotus Forms uses the Microsoft Windows capabilities to draw controls such as scroll bars and drop-down arrows in combo boxes. However, Lotus Forms cannot print these controls. You can still print a form document or template even though these controls do not appear on the printout.

“You can place bitmaps on buttons; however, Lotus Forms can print only the button, not the bitmap on the button.”

Following is a workaround you can use to effectively print the contents of a combo box or list box. There is no way to configure Forms to print a bitmap that has been added to a command button.

1. Create a text field.
2. Display the **Properties** box for the text field.
3. Change to the **Color** tab. Set the line color of the text field to T (transparent).
4. Change to the **Styles** tab. Remove the check from **Include Field Label** (so the field label for the text field does not print).
5. Create a script to set the contents of the text box equal to the contents of the combo box or list box. To do this:
  - a. Select the text box, then click on the right mouse button.
  - b. Select **Script** from the drop-down menu.
  - c. Change the **Proc** from **AlterEdit** to **Formula**.
  - d. Write a formula to set the value (contents) of the text field equal to the selection in the list box or combo box. For example  
`TxtPrint.Value=TxtSelect.`  
Value where TxtPrint is the name of the text field and TxtSelect is the name of the list box or combo box.
  - e. At this point, the script should resemble the following:

```
SUB FORMULA TxtSelect (f1 as Field)
TxtPrint.Value=TxtSelect.
Value
END SUB
```
  6. Change to the **Form** page.
  7. Move the text field directly behind the list box or combo box (so that the text field is not visible on the form).
  8. Change to the **Filler**. Select an item from the combo box or list box and print the form.

# Corrective Service Information

Figure 1 shows maintenance release levels for the listed products. This information is effective as of November 28, 1995. CSDs may have been updated since press time.

To order all service packages—except for the OS/2 2.0, OS/2 2.1, OS/2 2.1 for Windows, and OS/2 2.0 Toolkit ServicePaks—call IBM Software Solution Services at (800) 992-4777. For the OS/2 2.0 ServicePak (XR06100), OS/2 2.1 ServicePak (XR06200), OS/2 2.1 for Windows ServicePak (XR06300), or the

IBM Developer's Toolkit for OS/2 2.0 ServicePak (XR06110) on diskettes or CD-ROM, call (800) 494-3044. Most OS/2 service packages are also available electronically from the following sources:

■ **OS/2 Bulletin Board Service (BBS):**

In Software Library, select Option 2. (Corrective services are also listed under the General category on the IBMLink BBS.) To subscribe to the OS/2 BBS, call (800) 547-1283.

■ **IBM Personal Computer Company (PCC) BBS:** Call (919) 517-0001.

Service packages are located in Directory 4.

■ **CompuServe:** Download service packages from the IBM OS2 FORUM library (GO IBMOS2 IBM DF2).

■ **Internet:** Do an anonymous FTP from ps.boulder.ibm.com at /ps/products/. TCP/IP packages are located at software.watson.ibm.com at pub/tcpip/os2.

—Arnie Johnson, IBM Corporation,  
Austin, Texas

| Product/Component   | Release | CSD Level | PTF Number | Change Date | Comments   |
|---|---------|-----------|------------|-------------|--|
| OS/2 Standard Edition   | 1.3     | XR05150   | XR05150    | 02-10-93    |  |
| OS/2 Extended Edition   | 1.3     | WR05200   | WR05200    | 05-12-93    | WR05200 replaces WR05050, which can no longer be ordered on diskette |
| OS/2  | 2.0     | XR06100   | XR06100    | 09-01-93    | XR06100 replaces XR06055.  |
| OS/2 2.10 ServicePak  | 2.1     | XR06200   | XR06200    | 03-01-94    | This package is not for OS/2 2.1 for Windows.                        |
| OS/2 2.11 for Windows ServicePak                                | 2.11    | XR06300   | XR06300    | 05-24-94    |  |
| OS/2 Toolkit  | 2.0     | XR06110   | XR06110    | 09-01-93    |  |
|   | 1.3     | XR05053   | XR05053    | 03-23-92    |  |
| OS/2 LAN Server/Requester ServicePak                            | 2.0     | IP06030   | IP06030    | 04-25-93    |  |
| OS/2 LAN Server/Requester ServicePak                            | 3.0     | IP07060   | IP07060    | 05-10-95    | Supersedes IP07045.  |
| IBM LAN Server/Requester<br>OS/2 Warp Connect LS 4.0 ServicePak | 4.00    | IP08152   | IP08152    | 11-28-95    | Supersedes IP08150.  |
| OS/2 Extended Services<br>Database Manager ServicePak           | 1.0     | WR06035   | WR06035    | 11-18-93    | Supersedes WR06001, WR06002, WR06003, WR06004, WR06014, and WR06015. |
| DB2/2 ServicePak  | 1.0     | WR07042   | WR07042    | 06-08-95    |  |
| DB2/2 ServicePak  | 2.1     | WR08049   | WR08049    | 10-12-95    |  |
| DDCS/2 ServicePak   | 2.0     | WR07031   | WR07031    | 02-06-95    |  |
| Database Manager DB2/2  | 1.2     | WR07047   | WR07047    | 06-06-95    |  |
| DDCS/2  | 2.0     | WR07046   | WR07046    | 06-06-95    |  |
| Client Application Enabler/2 (CAE/2)                            | 1.2     | WR07043   | WR07043    | 06-06-95    |  |
| Software Developers Kit/2 (SDK/2)                               | 1.2     | WR07048   | WR07048    | 06-06-95    |  |
| SDK/Windows ServicePak  | 2.1     | WR08050   | WR08050    | 10-12-95    |  |
| Extended Services Comm Mgr ServicePak                           | 1.0     | WR06025   | WR06025    | 11-29-93    |  |

Figure 1. Maintenance Release Levels (continued on next page)

| Product/Component                                | Release               | CSD Level | PTF Number | Change Date | Comments   |
|--|-----------------------|-----------|------------|-------------|--|
| System Performance Monitor (SPM/2) ServicePak    | 2.0                   | WR06075   | WR06075    | 12-10-93    |  |
| LAN Distance ServicePak                          | 1.1                   | IP07050   | IP07050    | 10-18-94    |  |
| OS/2 Network Transport Services/2 SelectPak      | 2.11/2.20.1<br>2.20.2 | WR07060   | WR07060    | 05-10-95    | Must be LAPS 2.11 or above. If not, order WR07045 first. |
| LAN Server 4.0 MPTS                              | 4.0                   | WR08150   | WR08150    | 10-18-95    |  |
| LS 4.0 MPTS Warp Connect                         | 1.0                   | WR08152   | WR08152    | 11-06-95    |  |
| Communications Manager/2 Version 1.01 ServicePak | 1.01                  | WR06050   | WR06050    | 06-11-93    | Available only on diskette.                              |
| CM/2 Version 1.11 ServicePak                     | 1.11                  | WR06150   | WR06150    | 05-31-94    | Available on diskette and CD-ROM.                        |
| DOS  | 4.0/4.01              | UR35284   | UR35284    | 09-26-91    |  |
|  | 5.0                   | UR37387   | UR37387    | 09-22-92    |  |
| C Set/2 Compiler                                 | 1.0                   | CS00050   | XR06150    | 06-29-93    |  |
| C Set C++ Compiler                               | 2.0/2.01              | CTC0002   | XR06102    | 12-15-93    |  |
| C Set C++ Compiler                               | 2.0/2.01              | CTC0010   | XR06190    | 09-15-94    |  |
| C Set C++ Utilities                              | 2.01                  | CTM0006   | XR06196    | 09-15-94    |  |
| C Set C++ Utilities                              | 2.00                  | CTL0007   | XR06197    | 09-15-94    |  |
| TCP/IP for OS/2 Base and Application Kit         | 2.0                   | UN64092   | UN64092    | 08-24-94    |  |
| TCP/IP for OS/2 DOS Access                       | 2.0                   | UN57546   | UN57546    | 08-24-94    |  |
| TCP/IP for OS/2 Extended Networking              | 2.0                   | UN60005   | UN60005    | 06-21-94    |  |
| TCP/IP for OS/2 Programmer's Toolkit             | 2.0                   | UN57887   | UN57887    | 06-21-94    |  |
| TCP/IP for OS/2 Domain Name Server               | 2.0                   | UN60004   | UN60004    | 08-24-94    |  |
| TCP/IP for OS/2 Network File System              | 2.0                   | UN57064   | UN57064    | 06-21-94    |  |
| TCP/IP for OS/2 X-Windows Server                 | 2.0                   | UN68122   | UN68122    | 01-20-95    |  |
| TCP/IP for OS/2 X-Windows Client                 | 2.0                   | UN59374   | UN59374    | 08-24-94    |  |

Figure 1. Maintenance Release Levels

#### Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

Advanced Peer-to-Peer Networking, AIX, AIX/6000, APPN, AS/400, BookManager, BookMaster, Common User Access, Communications Manager, C Set ++, CUA, DATABASE 2, DATABASE 2 OS/400, DB2, DB2/400, DB2/6000, Distributed Database Connection Services/2, DProp, DRDA, DSOM, DualStor, IBM, IBMLink, IIN, LAN Distance, LANStreamer, Micro Channel, MVS, MVS/OE, NetView, OS/2, OS/400, Person to Person, PowerPC, Presentation Manager, PS/2, RISC System/6000, ServicePak, SOM, System/390, ThinkPad, Ultimeda, ValuePoint, VisualAge, VisualGen, VM, VoiceType, WIN-OS2, Workplace Shell, XGA

Windows is a trademark of Microsoft Corporation.

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

Other company, product, and service names may be trademarks or service marks of others.

These back issues of *Personal Systems* are available to provide valuable information. Indicate the desired quantity for the issues you want to order and complete the information on the following page.

### **November/December 1995**

- What's New?
- Road Trip! Shopping the Internet
- Command-Line Commando
- Getting Warped and Connected Too!
- Infrared: LANs Without Wires
- Security and Auditing in IBM LAN Server
- Multi-User Performance Testing in a Client/Server Environment
- DCE Cell Performance: High Water Marks
- Plug and Play in PC DOS 7

### **September/October 1995**

- What's New for OS/2?
- Mesa 2 for OS/2
- Manage Your Files with FileStar/2 for OS/2
- PartitionMagic for OS/2
- Managing LAN Server Home Directories
- IBM DualStor for OS/2
- Human-Computer Interaction Overview
- User Interface 2000
- IBM's Strategy for OS/2 Platform Products Fix Support
- Road Trip! Back to School
- TalkLink Gets a Facelift
- OpenDoc and Human-Computer Interaction
- Supporting HCI Technologies in Applications
- An Introduction to Speech Recognition with OS/2
- Intelligent Agents: A Primer
- CID Installation of OS/2 and Its Platform Applications
- Creating Your Own INF Hyperlinked Files

### **July/August 1995**

- What's New for OS/2?
- The Soap Box Derby
- Easily Load and Lock Desktops
- Road Trip! Cruisin' to the Olympics
- DB2 for OS/2 V2.1: The Next Generation
- OS/2 Victories from the Data Management Front Lines
- Voting Kiosks: The Future of Electronic Elections
- Performance Enhancements in DB2 for OS/2 V2.1
- DB2 for OS/2 Administrative Tools
- Database Recovery with DB2 for OS/2
- Getting Object-Oriented with DB2 for OS/2 V2.1
- Enhanced SQL in DB2 for OS/2 V2.1
- Enterprise-wide Connectivity Using DB2
- Visualizer Development
- Performance: DCE RPC as a DB2 for OS/2 and DB2 for AIX Transport
- Remote Program Load of OS/2 Warp from NetWare 3.12

### **May/June 1995**

- What's New for OS/2?
- Thanks for the Memory
- Road Trip! Disney on the Internet
- Apache Students Use the Power of the Pen (Light Pen)
- Visualizer: The Conversion Continues
- The Internet: A New Dimension?
- IBM LAN Doctor Services
- Borland C++ 2.0 Brings OWL to the OS/2 Presentation Manager
- LAN Server Logon Internals
- LAN Server 4.0 Performance, Capacity Enhancements, and Tuning Tips
- OS/2 Warp for Developing PC Games
- Controlling the OS/2 Desktop From a File Server
- Jump-Start Your PC with Component Upgrades

### **March/April 1995**

- What's New for OS/2?
- Mesa 2: Gaining the Competitive Edge with OS/2
- Managing the Workplace Shell with DeskMan/2
- Circus du COMDEX: The Running of the Geeks
- Road Trip! Touring the Side Roads of the Internet
- What's New in PC DOS 7
- OS/2 Boot and Recovery Options
- TCP/IP: How It Works
- A Guide to OS/2 Warp's Internet Access Kit
- CID Installation of OS/2 Warp and LAPS
- Wrapping Up an OO Experience

### **January/February 1995**

- Technical Connection Personal Software Is the Answer!
- Visualizer, DB2, and You—An End-User's Perspective
- Insiders' Software Unveiled
- Need a Specialist for Your LAN Server 4.0?
- One-Stop Shopping
- OS/2 Warp
- OS/2 for SMP
- Multimedia File I/O Services
- Need a Fix?
- IBM LAN Server 4.0: New Features and Comparisons with NetWare
- IBM DCE Heterogeneous Enterprise Performance

### **November/December 1994**

- Evolution, Not Revolution—Pen Computing Comes of Age
- Handwriting Recognition: The State of the Art
- Pen Digitizing Hardware
- It's HapPENing!
- Bill Carr: Fastest Draw in the West
- Work Management in the Field
- Communicating Without Wires: IBM's Mobile Communications Module
- Tomorrow's Networking Today—from IBM's Personal Systems Competency Center
- Customers Speak Out About Consult Line
- New DeScribe 5.0—Leader of the Pack
- Super-Fast PenDOS
- Pen for OS/2
- A Development Environment for Pen-Centric Applications
- Writing DOS Installation Programs for Selective Boot Systems
- OS/2 for PowerPC: Transforming Architecture into Implementation

### **September/October 1994**

- "Sneaker Net" or Systems Management?
- Like Father, Like Son
- The Book Shelf
- Cajun Electric Cooks Up OS/2 GUI with VisPro/REXX!
- Application Development by Program Integration
- IBM REXX for NetWare
- GammaTech REXX SuperSet/2—Give Your REXX Programs the Power of C
- BranchCard: A Viable Option to Stand-Alone Hubs
- A Hands-On Primer for REXX
- Visual REXX Development Environments
- CID Installation of OS/2 2.11 and LAPS
- Upgrading from Microsoft LAN Manager to IBM LAN Server 3.0
- Stretching Your LAN with LAN Distance
- DB2/2—More Than Ever Before!
- NetBIOS, SNA, and NetWare IPX Coexistence Under OS/2

## July/August 1994

IBM's Personal Systems Support Family—Customer-Influenced

Design

OS/2 Times and Scores the 1994 Indianapolis 500

Software Compatibility: Good Relationship or One Night Stand?

Migrating Windows Applications to OS/2: Easing the Migration Path

OS/2 Conference Draws Praise

DCE: An Application Primer

Distributed Performance Characteristics of IBM DCE for OS/2

Architecture Soup: Understanding Modern IBM PC Architecture

TSHELL: A Text-Based Alternate Shell for OS/2

Extended Attributes for Files

Developing Lotus Notes Applications

Conserving Power with Personal System Power Management

Superstor/DS Data Compression in PC DOS 6.x

LAN NetView Object Registration Services

## May/June 1994

"Wrightsizing" at USAir

Getting the Word Out at Chemical Banking Corporation

Back Up for the Future

Lost in Cyberspace

The Book Shelf

Threads

Redirected Installation of OS/2 2.x

LAN Server Ultimeda 1.0 Performance and Tuning

## March/April 1994

If I Only Had a Brain

Speech Recognition Products Untie Your Hands

Telecommuting in the '90s

Point of View: Not Just Another Database Article

Professional Certification Program from IBM

Celebrate the Past on Your Trip Back to the Future!

OS/2 2.1 Performance Tuning Tips—Part II

PC File Systems

NetWare 4.01 for OS/2: Features and Installation

NetWare Requester for OS/2, V2.01: Features and Installation

What's New in Novell NetWare 3.12?

LAN Analysis Using IBM's DatagLANce Network Analyzer

NetWare Questions and Answers

Send this form with a check or money order, payable to **NCM Enterprise**, to: NCM Enterprise, P.O. Box 165447, Irving, TX 75016-9939. You can also fax both pages of this form to **(214) 518-2507** (please include VISA / MasterCard / AmEx / Diners number and expiration date), or call **(800) 678-8014**. All orders must be prepaid. Checks must be in U.S. dollars.

### B A C K     I S S U E     O R D E R     F O R M

NAME \_\_\_\_\_

Price is \$12.00 per issue, plus \$3.95 shipping & handling per copy. Overseas orders add \$9.95 shipping & handling per copy.

COMPANY \_\_\_\_\_

Texas residents add applicable sales tax.

ADDRESS \_\_\_\_\_

I have enclosed a:  Check  Money order  
Charge to:  VISA  MasterCard  AmEx  Diners

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CREDIT CARD NUMBER \_\_\_\_\_

TELEPHONE (\_\_\_\_\_) \_\_\_\_\_

SIGNATURE \_\_\_\_\_ EXPIRES \_\_\_\_\_

IBM believes the statements contained herein are accurate as of the date of publication of this document. However, IBM hereby disclaims all warranties as to materials and workmanship, either expressed or implied, including without limitation any implied warranty of merchantability or fitness for a particular purpose. In no event will IBM be liable to you for any damages, including any lost profits, lost savings, or other incidental or consequential damage arising out of the use or inability to use any information provided through this service even if IBM has been advised of the possibility of such damages, or for any claim by any other party.

Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This publication could contain technical inaccuracies or typographical errors. Also, illustrations contained herein may show prototype equipment. Your system configuration may differ slightly.

IBM has tested the programs contained in this publication. However, IBM does not guarantee that the programs contain no errors.

This information is not intended to be a statement of direction or an assertion of future action. IBM expressly reserves the right to change or withdraw current products that may or may not have the same characteristics or codes listed in this publication. Should IBM modify its products in a way that may affect the information contained in this publication, IBM assumes no obligation whatever to inform any user of the modification.

Some of the information in this magazine concerns future products or future releases of products currently commercially available. The description and discussion of IBM's future products, performance, functions, and availability are based upon IBM's current intent and are subject to change.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not imply giving license to these patents.

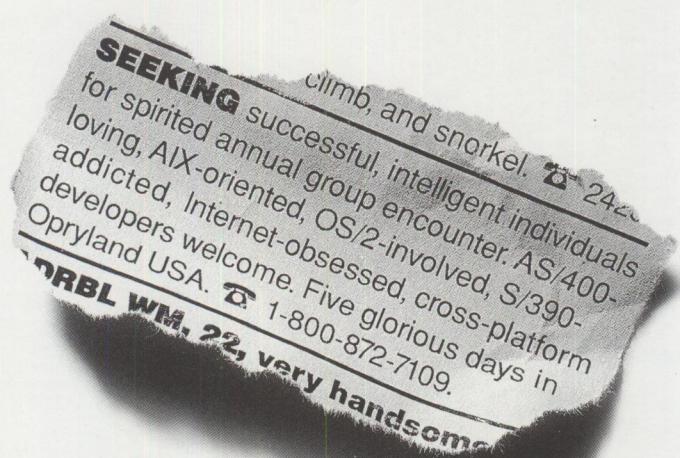
It is possible that this material may contain reference to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such

references or information must not be construed to mean that IBM intends to announce such products, programming, or services in your country.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation whatever.

The articles in this publication represent the views of their authors and do not necessarily represent the views of IBM. This publication may contain articles by non-IBM authors. IBM does not endorse any non-IBM products that may be mentioned. Questions should be directed to the authors.

Publication of advertising material in this magazine does not constitute an expressed or implied recommendation of endorsement of IBM of any particular product, service, company, or technology. IBM takes no responsibility whatsoever with regard to the selection, performance, or use of any advertised products. All understandings, agreements, or warranties must take place directly between the vendor and prospective users.



climb, and snorkel. ☎ 2420

**SEEKING** successful, intelligent individuals  
for spirited annual group encounter. AS/400-  
loving, AIX-oriented, OS/2-involved, S/390-  
addicted, Internet-obsessed, cross-platform  
developers welcome. Five glorious days in  
Opryland USA. ☎ 1-800-872-7109.

DRBL WM. 22, very handsome



Come to the 1996 IBM International Technical Interchange, April 22-26 in Nashville, TN. There's a lot to experience: Insights into IBM's latest software strategies. Over 300 unique elective sessions, including App Development, Network-Centric and Client/Server Computing. Tips and techniques for building a competitive advantage. More than 200 exhibitors. Free Developer Connection software. And, of course, some nifty

T-shirts. For enrollment information and program brochure, call 1 800 872-7109 (U.S. & Canada) or 1 617 893-2056 (Outside N. America). Or visit our Web site at [http://www.austin.ibm.com/developer/conferences/ti\\_96](http://www.austin.ibm.com/developer/conferences/ti_96) for details.



Solutions for a small planet™

# Do You Have a Practical Joker in Your Office?

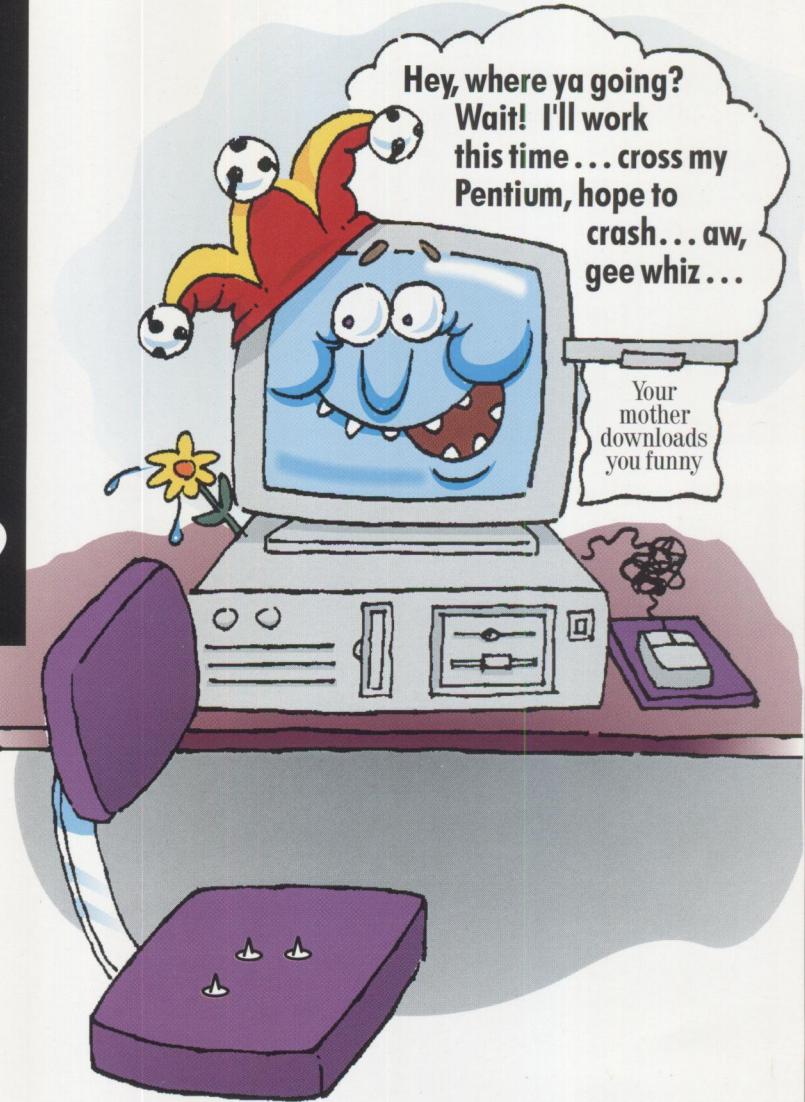
We'll solve  
your OS/2  
problems so  
fast it's not  
funny.

If it can be Designed, Developed or  
Debugged on OS/2, we can do it.

Infrastructure Incorporated is committed to its customers. We are experts in Client / Server system and application Architecture, Design and Development. We excel in Debugging and Performance Tuning, Subsystem Programming, and Testing. We are committed to the OS/2 platform from 1.x to OS/2 Warp. Infrastructure has the skills and experience to help make your OS/2 projects successful!



Voice: 1-800-642-3953 Internet: iHELP@ibm.net Fax: 817-321-3039  
Are you an OS/2 Guru? Email or Fax us your resume and join the team of experts



## iiDesign

*Let the experts help you make the correct decision!*

We can help validate your OS/2 Application Design and Network Architecture to insure you are taking advantage of today's technology.

## iiDevelopment

*New - SOM / DSOM / OpenDoc Consulting Services!*

Application / Subsystem Programming, Class Library Development, API Development, Problem Determination, Performance Tuning, Code Reviews and more... call us!!

## iiDebug

*We eat OS/2 hangs and traps for lunch every day!*

If you are experiencing OS/2 hangs, traps, memory leaks or performance problems, we can help pinpoint the source of the problem, even in OS/2 itself.

## iiTesting

*Thoroughly test your unique hardware, software & network!*

Complete hardware based testing used to stress your most complex Client / Server Architectures. Roll out with confidence! Don't wait for your Practical Joker to strike!